INDIA RUBBER WORLD

OUR 61st YEAR

A BILL BROTHERS PUBLICATION

AUGUST, 1950

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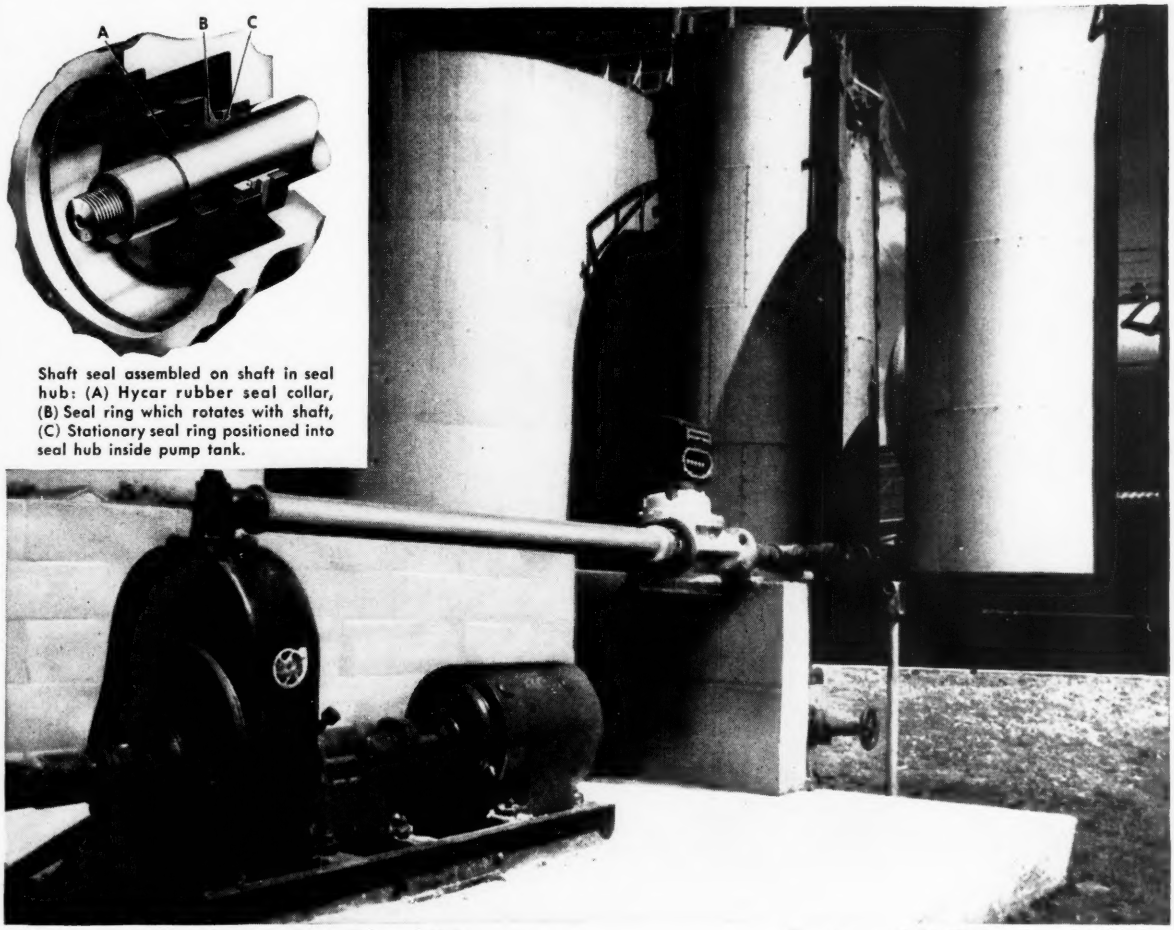
Another development using

B. F. Goodrich Chemical Company *raw materials*



Shaft seal assembled on shaft in seal hub: (A) Hycar rubber seal collar, (B) Seal ring which rotates with shaft, (C) Stationary seal ring positioned into seal hub inside pump tank.

Self-priming centrifugal pump by Marlow Pumps, Ridgewood, N. J. *Hycar parts supplied by The Laurel Co., Garfield, N. J.*

HYCAR helps put shaft leaks out of business . . . quick!

PREVENTING shaft leaks is done better than ever with a new mechanical shaft seal pictured here. And Hycar rubber helps turn the trick!

The pump shown above, equipped with the new shaft seal, is used at an oil company bulk plant. Leakage of liquid or entrance of air where the rotating pump shaft enters the stationary pump housing must be prevented —to maintain speedy, efficient operation. Leaks never get started, with this Hycar-protected shaft seal on the job!

The cutaway view shows the seal components. Two perfectly flat seal surfaces are run together and held in sealing contact by the Hycar rubber seal collar. The collar drives the rotating seal ring, keeps it in contact with the stationary seal ring. At the same time, it seals the rotating ring to the pump shaft.

Naturally, the rubber seal collar has to have exceptional qualities. That's why Hycar was selected. For to seal effectively, the collar had to slip on the pump shaft yet not "freeze" to it. It must possess resilience, good abrasion-resistance, oil-and-heat-resistance. And high tensile strength, plus low compression set at high temperature are also necessary.

On all counts, Hycar fills the bill perfectly. For Hycar resists oil, gas, heat, weather and wear—has many more advantages. Hycar may be just what you need to develop or improve a product—start more profits coming your way. For technical bulletins, please write Department HC-4, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Need abrasion resistance? Hycar has it—plus high tensile strength and more advantages.

Hycar
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American Rubber

GEON polyvinyl materials • HYCAR American Rubber • GOOD-RITE chemicals and plasticizers

For white wall tires that stay that way

Use Philblack* O *or* Philblack* A!

There's no stain problem when you use either Philblack O or Philblack A in carcass stocks of white side-wall tires. These superior blacks do not bleed through the white rubber stock. They don't stain the dazzling white walls. And they do an excellent job of improving the good looks and life-expectancy of the tire!

Philblack A dissipates heat, too; helps tires run cool! And Philblack O, the high abrasion furnace black, provides amazing flex life and remarkable resistance to cuts, cracks, and abrasion. For your convenience, the Philblacks are available in bags or bulk.

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PHILBLACK SALES DIVISION

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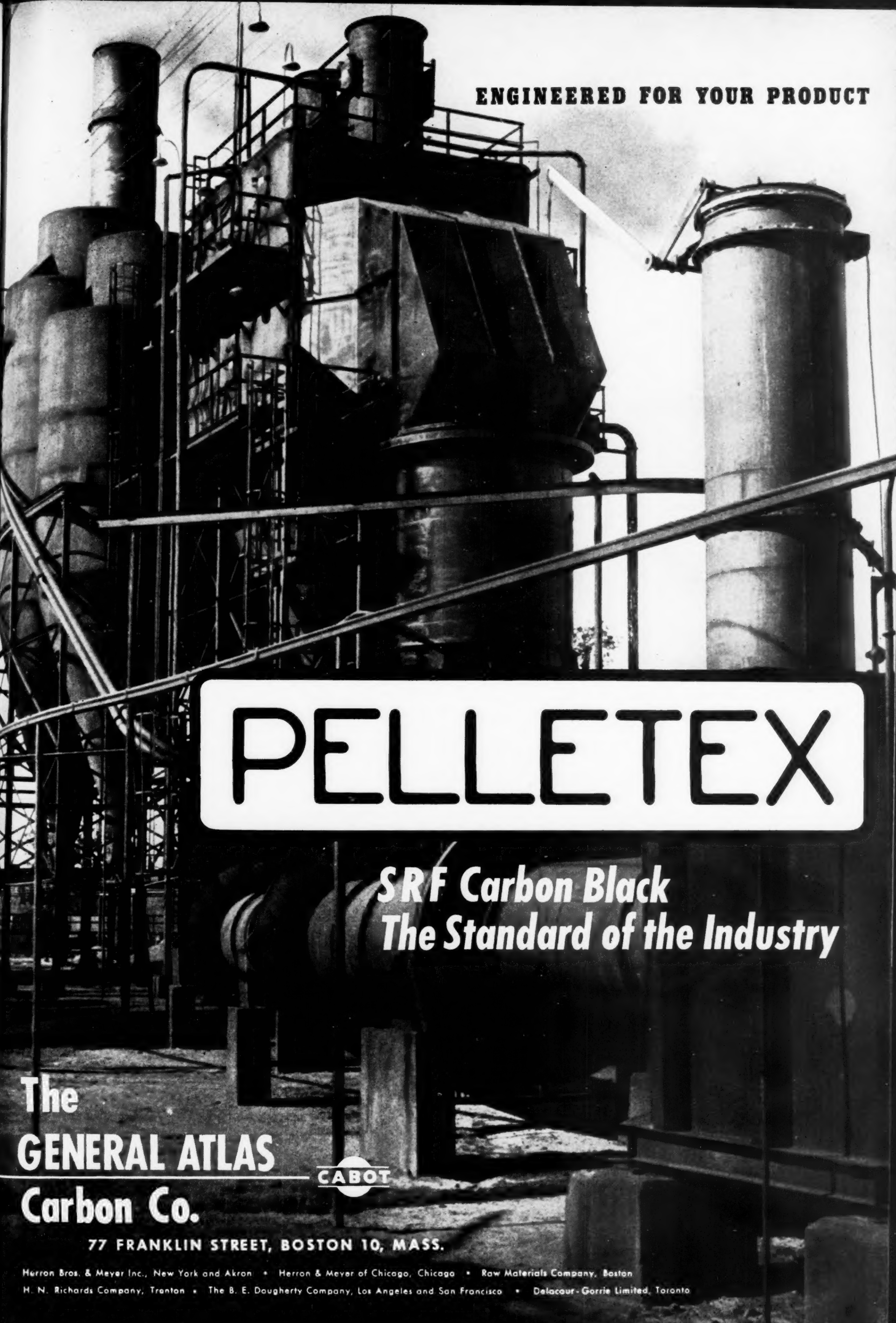
Warehouses in Akron, Boston, Chicago and Trenton. West Coast agent: Harwick Standard Chemical Company, Los Angeles. Canadian agent: H. L. Blachford, Ltd., Montreal and Toronto.

Phillips 66

*A Trademark


HARDNESS
USE PROVED
Products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H. N. Richards Company, Trenton • The B. E. Dougherty Company, Los Angeles and San Francisco • Delacour-Gorrie Limited, Toronto

HERE IS A THREE-PART BANBURY

The size 11 Banbury Mixer was originally designed for a top horsepower of 250 at 20 RPM. This was increased first to 300 HP at 20 RPM, then to 600 HP at 40 RPM and has now reached 800 HP at 40 RPM.

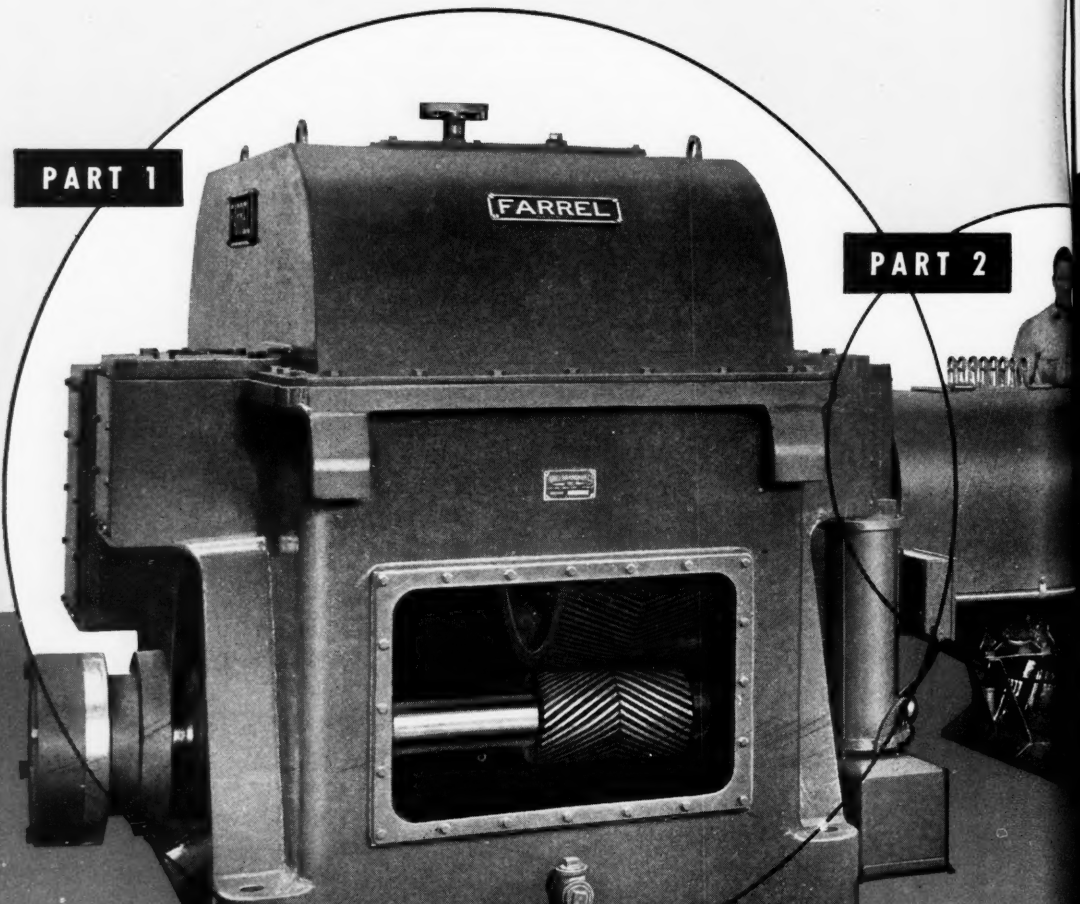
The need for a machine capable of taking the heavier loads resulting from mixing tougher stocks at higher speeds brought about the development of the new Size 11 Uni-drive Banbury — the three-part machine illustrated here.

PART ONE—The gears formerly mounted on the rotors are enclosed with the primary reduction gears in a separate housing, in which the gears and bearings are automatically lubricated. Smooth, efficient power transmission is provided under the heaviest torque loads. Service life is increased and maintenance of the gearing and other elements is reduced.

PART TWO—Smooth-operating universal spindles connect the Uni-drive with the Banbury rotors, transmitting power to each individually.

PART THREE — The Banbury Mixer itself has been strengthened, and new, harder materials are used for the working elements to withstand the more intensive work of mixing the stiffer stocks coming into use, and for the increasingly important application of devulcanizing and reclaiming rubber. Elimination of the gearing removes the severe strain formerly imposed directly on the machine from this source, decreasing wear and simplifying necessary maintenance and repairs.

The Uni-drive Banbury is now available in sizes 3A, 11 and 27. Existing installations of standard mixers can be converted to Uni-drive, usually in the same floor space. We shall be glad to supply full information on request—on new Banburys, repairing or altering old ones, or on any of the other production units listed.



SAVES UP TO 60%

by using Bemis TITE-FIT TUBING

This recent letter from a Tite-Fit Tubing customer shows what big savings are realized when this waste-eliminating method is used.

This versatile tubing fits almost any shape and a wide variety of package sizes. One roll may cover many different diameters and lengths without waste.

Thermoid *Company* AUTOMOTIVE · INDUSTRIAL · OIL FIELD · TEXTILE PRODUCTS
TRENTON · NEW JERSEY · USA

Bemis Brothers Bag Company
Second Avenue and 51st Street
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Gentlemen:

We have used Tite-Fit Tubing since its inception over 10 years ago. Accurate time study figures show our savings in labor costs on regular packaging operations to be as high as 33% to 60%.

In addition, Tite-Fit Tubing has also provided the superior covering that is required for our export packaging. We are particularly pleased by the favorable comment we receive from our customers on the neat, secure bales in which our merchandise is shipped.

Very truly yours,

Ward A. Hamit,

Traffic Manager,
Thermoid Company

Perhaps you will find equally large savings with Tite-Fit Tubing. It's worth investigating. Get the facts. Mail the coupon now.

BEMIS BRO. BAG CO.
Brooklyn 32, New York

MAIL COUPON NOW

BEMIS BRO. BAG CO., 5134 Second Ave., Brooklyn 32, N.Y.

- ☐ Send descriptive folder on TITE-FIT TUBING
- ☐ Send sample. Our packages are approximately ____ inches in circumference. (Please specify).

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*Firm*____________________

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RUBBER & PLASTICS MACHINERY BULLETIN

Reporting News and Machine Design Developments

IN BUSINESS TO NRM REDUCE YOUR COSTS

Many Variables Affect Special Extruder Applications

There is no "standard extruder" suitable for maximum efficiency in every application

There are many factors which must be taken into consideration when determining special extruder applications. Some of these factors and variables which affect operation are: (1) the nature of the compound (2) the size and shape of the section (3) the type of feed (4) the condition and form of the material as it is brought to the extruder (5) the type and style of die head (6) the condition of the extruder itself, such as amount of wear, type of drive and other factors.

Taking item 6 above, as an example, one may easily see how the character of the extrusion would be altered if condition of machine wear were to be ignored. For instance, the clearance between the extruder screw and liner varies with the number of hours of use and types of compounds run through the cylinder.

Following is a ready reference chart on clearances for new NRM tubers and the maximums of "worn-in" clearances for efficient operation:

Size Extruder	Total Diametrical Clearance Between Screw and Bore of Cylinder Liner: New Machine	Used Machine (Maximum)
2½"	.007" to .009"	.025" to .030"
3¼"	.008" to .010"	.028" to .033"
3½"	.010" to .012"	.030" to .035"
4½"	.010" to .012"	.030" to .035"
6"	.012" to .015"	.050" to .055"
8"	.013" to .016"	.055" to .060"
8½"	.013" to .016"	.055" to .060"
10"	.017" to .020"	.060" to .065"
12"	.017" to .020"	.060" to .065"

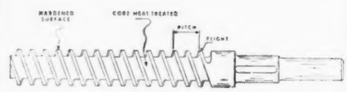
In addition, the equipment engineer should always consider the machinery design features which can affect operations on special extruding jobs. Some of these are:

1. Drive—Variable speed DC or constant speed AC with variable speed coupling.
2. Transmission—Worm gear or double herringbone gear reductions.
3. Quick changeability of screws, liners, and dies.
4. Screw characteristics, single or double lead, constant or variable pitch, stelliting or flame-hardening.
5. Length of cylinder and screw; and position and size of hopper.

Because of the many variables involved, it should be clear that there is no such thing as a standard extruder that can be used for every application. Each installation must be carefully analyzed and consideration given to performance records on similar applications.

One thing you can plan on in every case—when you buy NRM you're taking advantage of over 30 years' creative engineering *and* actual manufacture experience devoted to extrusion equipment. Result: exclusive features which pay off in terms of higher quality extrusions at lower cost wherever NRM equipment is properly applied.

For complete details on NRM machinery or assistance in analyzing your extrusion processes, write or wire NRM, 47 West Exchange St., Akron 8, Ohio. No obligation!



NRM Extruder Screw showing special design features. "NRM specializes in screw designs".

EXTRUDING COLD RUBBER, OTHER SYNTHETICS REQUIRE SCREW CHANGES

As change-overs from natural rubber compounds to synthetics were made, it was found necessary to change extruder screw characteristics. The changes made compensate for differences in the frictional heat generated and for varying compression requirements.

Now, with the advent of "Cold Rubber", it has been found necessary to again examine screw flight characteristics so as to obtain maximum efficiency and quality of extruded product.

For example, changing compression ratio was indicated in order to get uniform flow from the die with no tendencies to pulsate. Also, the most success is now being obtained with a double flight screw (*see drawing at left*).

In addition, cold rubber extrusion has also made it necessary to change the flight contours or fillets between flights and the root diameter. Corrosive tendencies of cold rubber have also required a change in the surface condition of the entire flight length.

You can obtain complete, detailed information on rubber extrusion and processes by writing NRM—*specialists in screw design.*

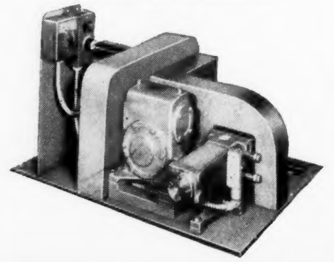
Small, Compact Bench Model Extruder Ideal for Lab. Work

NRM's 1" Bench Model extruder is small, compact and versatile. With a nominal capacity of 6-10 lbs. per hour, the Bench Model is *tops* for either laboratory work, small capacity regular production or both.

Particularly, the 1" model is ideally suited for laboratory operations where runs are small. A large volume of stock is not required to load the Bench Model's cylinder. The 1" extruder is complete with a ¾ hp. AC motor, a worm gear reducer and interchangeable spur gears to give a wide range of screw speeds and a vari-pitch sheave for fine speed adjustment.

The NRM Bench Model is suitable for checking extruding characteristics on many types of compounds through various die shapes including a small crosshead. Write for complete information on ways this 1" "pilot plant" can save you time, trouble and money!

The NRM 1" Bench Model is available both for electrical or steam heat. The cylinder is lined with a hard-surfaced, long-wearing Xaloy material.

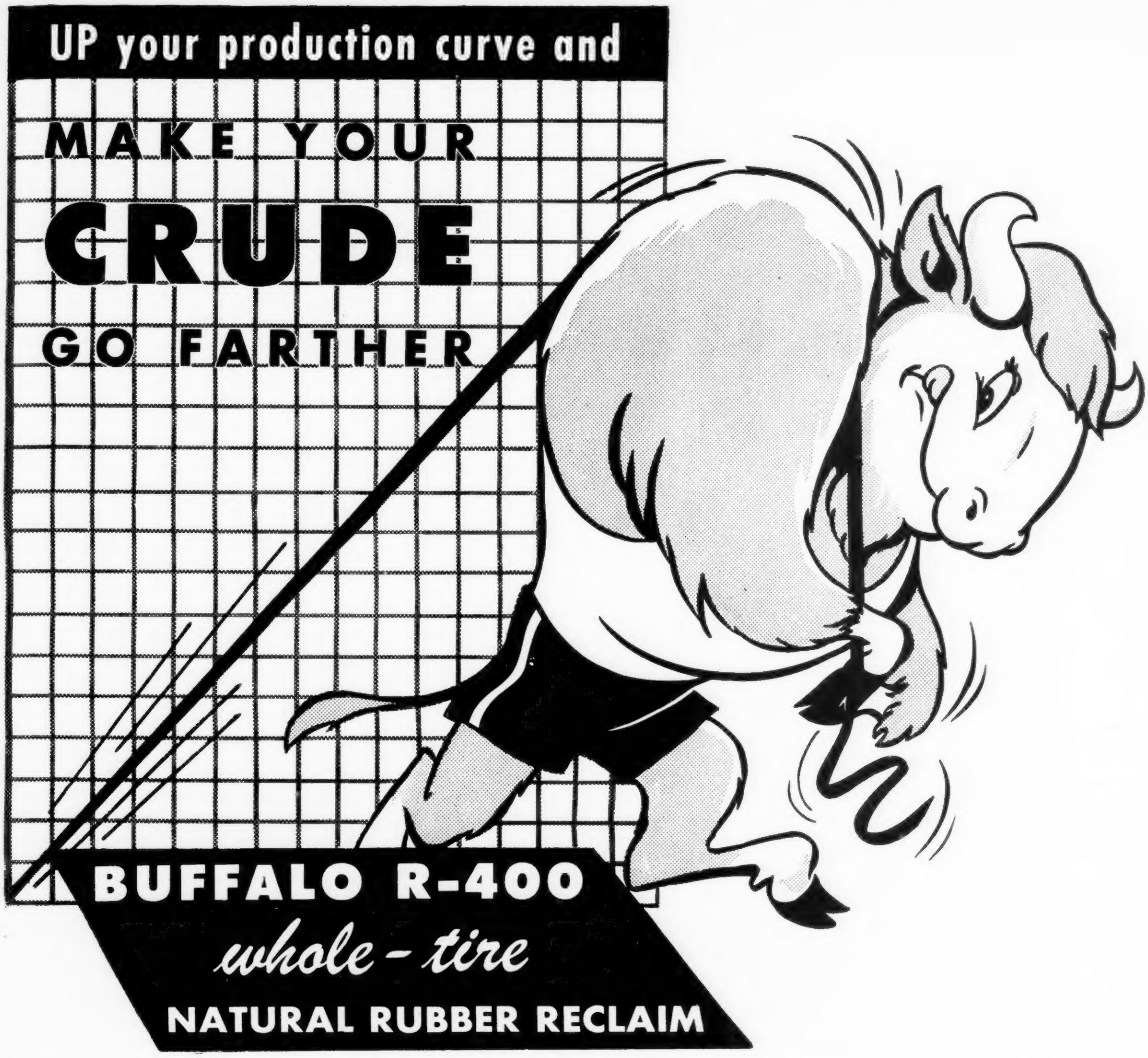


NATIONAL RUBBER MACHINERY CO.

General Offices & Engineering Laboratories
Akron 8, Ohio

PLANTS at Akron and Columbiana, Ohio and Clifton, N. J.
AGENTS East: National Rubber Machinery Co., Clifton, N. J.
West: S. M. Kipp, Box 441, Pasadena 18, Calif.
EUROPE Rubber Machinery: GILLESPIE & COMPANY
96 Wall Street, New York 5, N. Y.

Creative Engineering


UP your production curve and
MAKE YOUR
CRUDE
GO FARTHER
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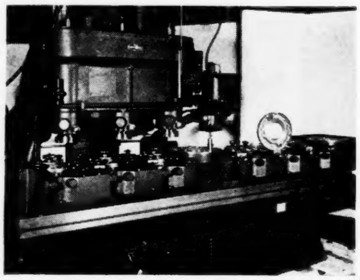
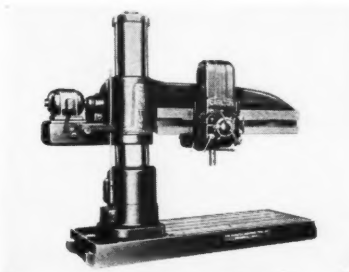
MOLD PLANT

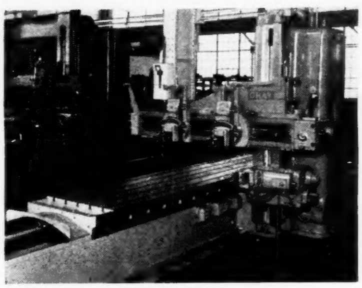
These five machines are representative of the complete line of machine tools of wide range and capacity, specially designed for making Quality Mechanical Molds, housed in this new plant.



▲ HYDROTEL Milling Machine—3 spindle, 17¾″ centers, 28″ x 60″

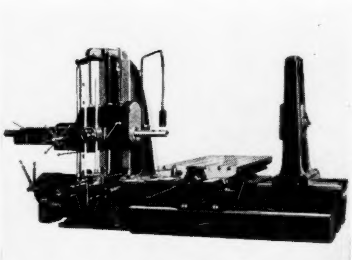


▲ CARLTON Radial Drill Press — 19″ Column, 6 Foot Arm

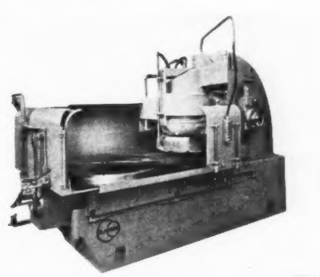


▲ GRAY Planer, Open Side—48″ x 16 Foot Table

LUCAS Horizontal Boring Mill—4″ Bar —40″ x 72″ Table ▼



BLANCHARD Rotary Grinder — 84″ Diam. Table — 72″ Magnetic Chuck ▼

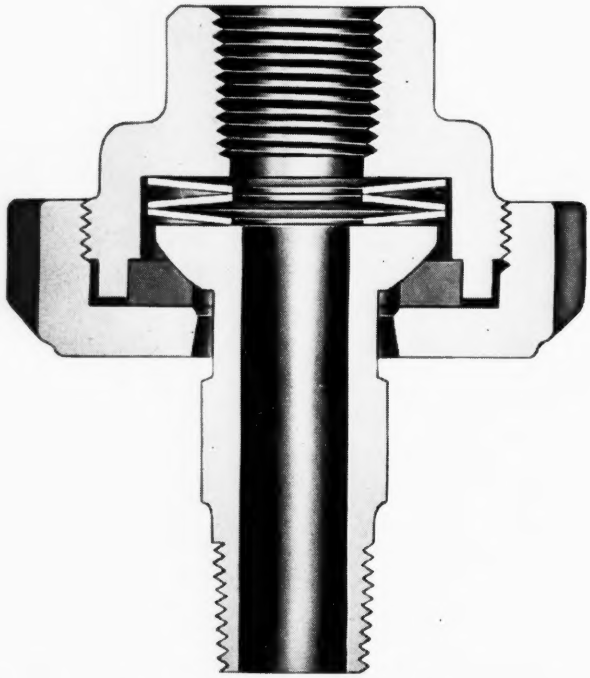


Mold Company

Akron 5, Ohio, U. S. A.

Improved Barco Rotary Swivel Joints

FOR MINIMUM FRICTION



FRICTION-FREE PERFORMANCE WITH LOWER TURNING TORQUE. This compact, lightweight, low cost joint is especially efficient at high and low temperatures and pressures. It handles alternating steam and cold water without leakage. It is much more compact for the same capacity and has performed successfully on continuous rotation applications up to 30 RPM. This new, low torque joint will greatly reduce power costs and worker fatigue. It is practically maintenance free.

WIDE TEMPERATURE AND PRESSURE RANGES. The new Barco Rotary Swivel Joints withstand these extreme ranges with complete safety, no chance of bursting. Angular motion compensates for misalignment and there is no restricted internal diameter as in flexible hose.

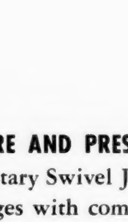
• • •

Install these remarkable joints now. Our engineers will gladly discuss your problems. Sizes 3/8", 1/2", 3/4", 1". When ordering, give complete information about pressures, temperatures, fluids or gases, and any other special conditions.

BARCO ***FLEXIBLE JOINTS***

Not just a swivel joint ...but a combination of a swivel and ball joint with rotary motion and responsive movement through every angle.

FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

"MOVE IN  EVERY  DIRECTION"

18101 Winnemac Avenue, Chicago 40, Illinois • *In Canada:* THE HOLDEN CO., LTD., MONTREAL, CANADA

NOW! 2 "PROTOX" ZINC OXIDES 166 and 167

FOR FASTER PROCESSING • FOR HIGHER REINFORCEMENT

Both Protox-166* and Protox-167* bring you all the well-known advantages of American Process Zinc Oxides . . . *plus* these important features:

- Faster, more uniform mixing
- Quicker, smoother tubing and calendering
- Improved tensile and tear resistance
- Higher modulus and resilience

Which Protox should you use? Consider these points:

1. Protox-166 and Protox-167 are essentially identical in processing and reinforcement properties, as indicated in the table below.

2. In Protox-167, dusting is practically eliminated and dispersions are even somewhat improved in comparison with Protox-166.

3. Protox-166 should be continued in use where water suspensions of Zinc Oxide are involved, as Protox-167 is resistant to wetting by water.

WHICH PROTOX DO YOU WANT TO TEST *NOW?*

COMPARISON OF PROTOX-166 AND PROTOX-167 ZINC OXIDES . . .

Identification	*Time of Cure (Min. at 20 lb.)*	*Tensile Strength (Lb./Sq. In.)*	*Per Cent Elongation*	*Load (Lb./Sq. In.) for Elongation of 300%*	*500%*	*Abrasion Resistance (Feldspar)*	*Shore Hardness*	*Tear Resistance*	*Min. to T-50 at 0°C*
Protox-166	10	675	700	120	315		31	25	39
	15	2200	670	440	1160		38	66	
	30	3420	655	660	1980	84	44	231	
	45	3560	635	785	2235	105	48	286	
	60	3600	620	825	2320	113	50	234	
	75	3515	605	850	2380		51	269	
	90	3380	585	855	2400		51	227	
Protox-167	10	1520	690	240	760		34	35	37
	15	2700	680	475	1390		39	87	
	30	3335	635	705	2000	82	45	237	
	45	3460	625	745	2120	101	48	325	
	60	3500	605	810	2300	106	49	306	
	75	3480	600	840	2320		50	308	
	90	3420	600	885	2340		51	270	

Identification	*Time of Cure (Min. at 20 Lb.)*	*Goodyear-Healey Pendulum: Indentation in mm.*	*Per Cent Rebound*	*Hardness (of Block) Shore*	*Rex*	*Compression Fatigue (Goodrich Flexometer)*: Per Cent Initial Comp.*	*Running Time and Per Cent Permanent Set*	*Max. Temp. Rise (°C.)*	*Dynamic Compression Initial*	*Final*	*Cut-Growth Resistance Tested at 70°C. Inches Failure 90,000 Cyc.*
Protox-166	60	9.31	83.4	47	50	20.4	15'-2.9	8.7	5.8	7.1	.65
Protox-167	60	9.25	84.1	48	51	21.1	15'-2.7	8.6	6.3	7.1	.73

FORMULA

Smoked Sheet	100
Sulfur	3
MBT	1
Agerite Powder	1
Stearic Acid	3
Zinc Oxide	100

***TEST CONDITIONS:**

Load—93 psi.
Stroke—0.25 inch
Oven Temp.—100°C.

*U.S. Patent 2,303,330

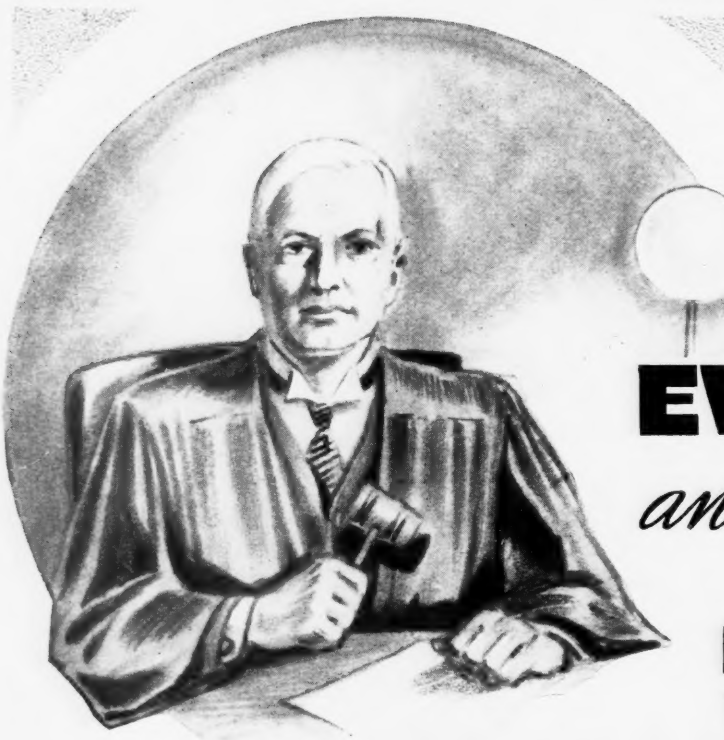
	Williams 3' Plast.	*Plasticity Recovery*
Protox-166	2.35	.15
Protox-167	2.40	.17

HORSE HEAD PRODUCTS

THE NEW JERSEY ZINC COMPANY

Founded 1848

160 Front Street, New York 7, N. Y.



EVALUATE *and* JUDGE THEN RENDER A VERDICT...

on what GLYCERIZED (LIQUID CONCENTRATE) LUBRICANT WILL DO FOR YOU

Investigate these **FACTS**

Prevents adhesion of hot rubber slabs when piled . . . banishes dust nuisance by replacing soapstone or talc . . . prevents sticking during cure of extrusions and flat pan coiled tubing . . . excellent release agent for molds, mandrels, air bags, belt drums . . . equally satisfactory for washing and finishing inner tubes; imparts satiny finish . . . greatly aids in the processing of insulated wire and cable. The Production Departments and Laboratories of many rubber manufacturers, through years of using GLYCERIZED, give ample proof of its outstanding qualities as a lubricant for natural, synthetic and reclaimed stocks. Write for sample on your letterhead, then evaluate. You are the judge of the results.

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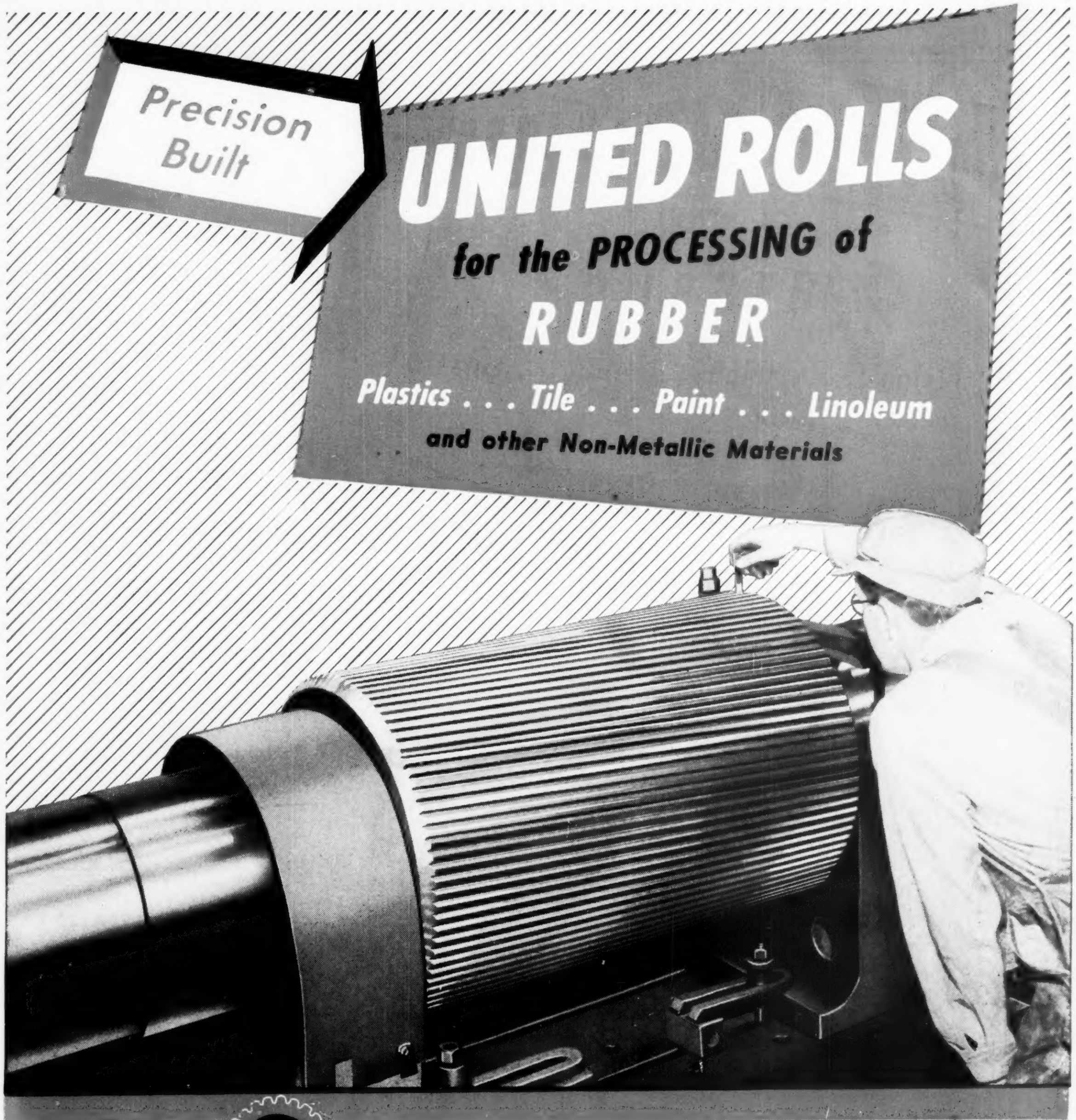

Corrugated Rubber Cracker Roll

UEFCO

Reg. T. M.

UNITED ENGINEERING AND FOUNDRY COMPANY

Pittsburgh, Pennsylvania

Plants at Pittsburgh · Vandergrift · New Castle, Youngstown · Canton

Subsidiaries: Adamson United Company, Akron, Ohio
Lobdell United Company, Wilmington, Delaware
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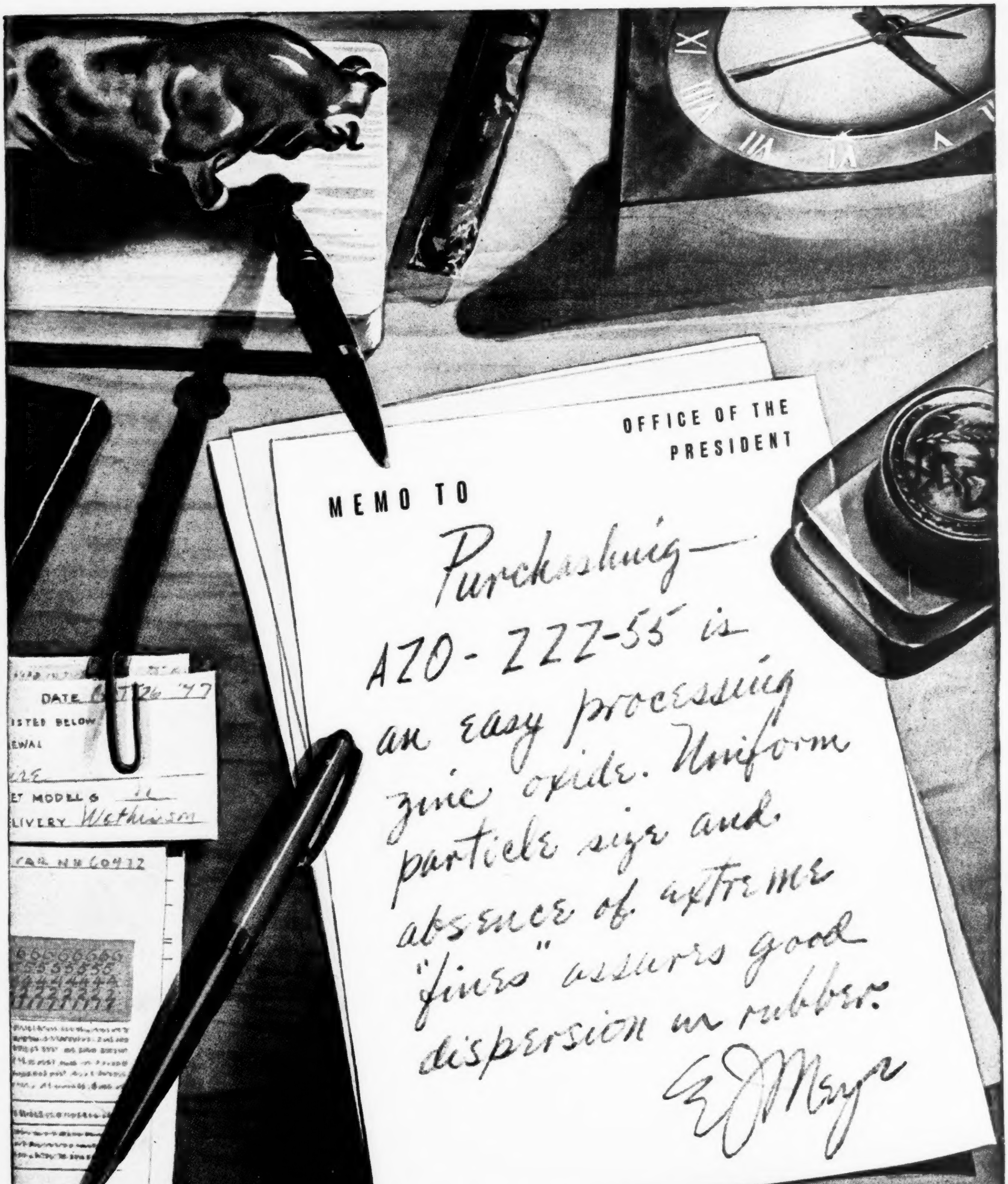
United rolls are in use in leading processing plants throughout the world. Their wide acceptance is the result of progressive research and more than 30 years experience in roll design and manufacture.

Consult us on your next requirement. Our engineers will be glad to assist you when specifying for conventional applications or for new or unusual processes.

Designers and Makers of Rolls and Rolling Mill Equipment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MEMO TO
Purchasing—
AZO-ZZZ-55 is an easy processing zinc oxide. Uniform particle size and absence of extreme "fines" assures good dispersion in rubber.

Chemicals you live by

When you need a WINNING combination

Wider markets, stiffer competition for vinyl products are leading to a combination of plasticizers in vinyl compounding. The right choice of co-plasticizer can produce product advantages as well as lower cost.

DIAMOND ALKALI'S Chlorowax* 40 is being selected as a secondary plasticizer for vinyl resins by more and more compounders. The reason: Chlorowax 40, in addition to its low cost, accomplishes an extension of the vinyl resin, provides low volatility, good color and non-inflammability.

Chlorowax 40 is liquid chlorinated paraffin containing 40% chlorine by weight, with a viscosity of approximately 25 poises at room temperature. It is stable, non-toxic, odorless, insoluble in water, soluble in a wide variety of organic solvents.

Our Technical Service Staff will be glad to furnish information regarding the primary plasticizers with which Chlorowax 40 has been successfully combined and to render any assistance you may require in formulating with Chlorowax 40. Just get in touch with our nearest sales office or write us direct.

*®

DIAMOND SALES OFFICES: Boston, New York, Philadelphia, Pittsburgh, Cleveland, Cincinnati, Chicago, St. Louis, Memphis and Houston. Also representatives in other principal cities.

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CHLOROWAX 40

DIAMOND ALKALI COMPANY...CLEVELAND 14, OHIO

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R-1599 **R-2199** **R-2899**

these Pure Light Red Iron Oxides by Williams assure it!

They represent the ultimate in red iron oxide colors for the rubber industry.

Williams iron oxides come to you with all the benefits of our 72 years in the pigment business . . . and as a result of our experience in producing pure red iron oxides to specifications of the leading rubber companies.

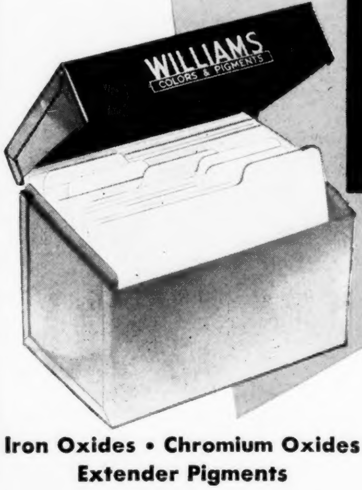
Each is manufactured to rigid specifications for copper and manganese content, pH value, soluble salts, fineness, color, tint and strength by controlled processes and with special equipment. The result is absolute uniformity of product.

If you haven't already done so, try these finest of all iron oxide colors. Your own tests will show there is no equal for Williams experience.

LET WILLIAMS PUT THE MICROSCOPE ON *Your* COLOR PROBLEM

Whatever your color problem, bring it to Williams. Our 72-year experience can often save you time, money, and headaches in proper color formulation.

Address Dept. 9, C. K. Williams & Co., Easton, Pa.



Iron Oxides • Chromium Oxides
Extender Pigments

WILLIAMS
COLORS & PIGMENTS

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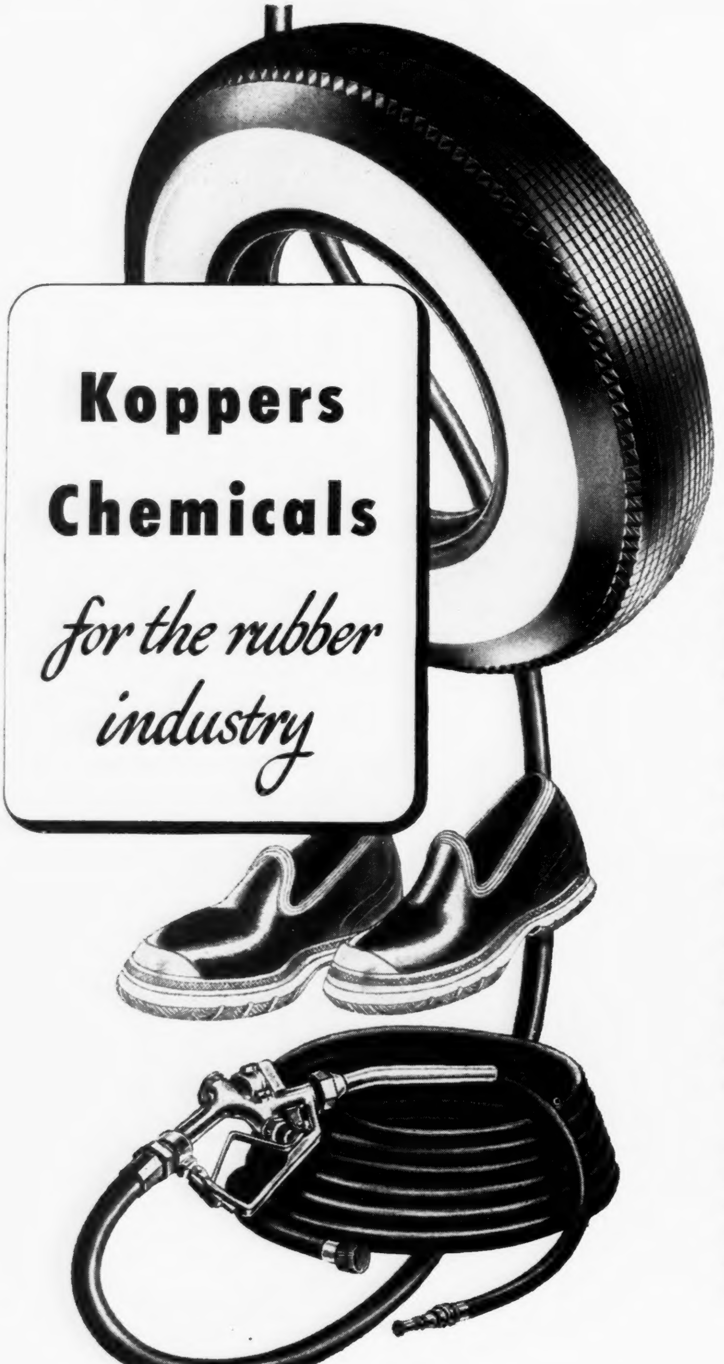

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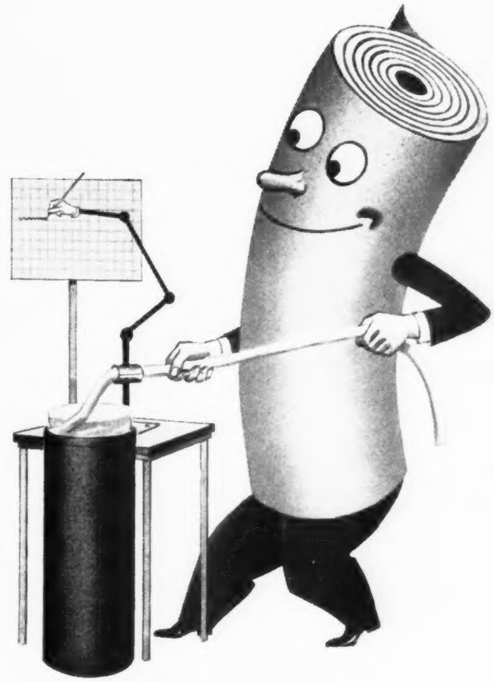

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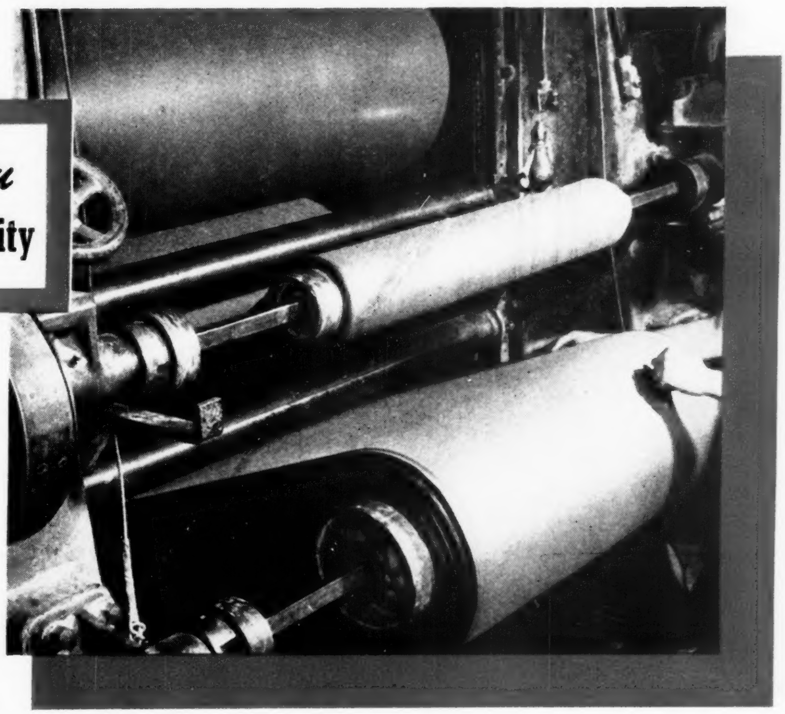

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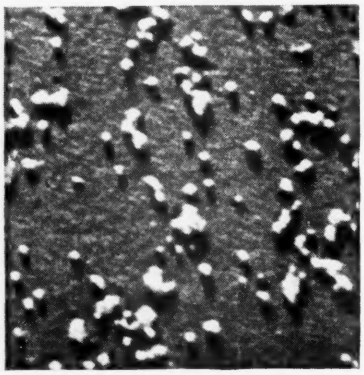

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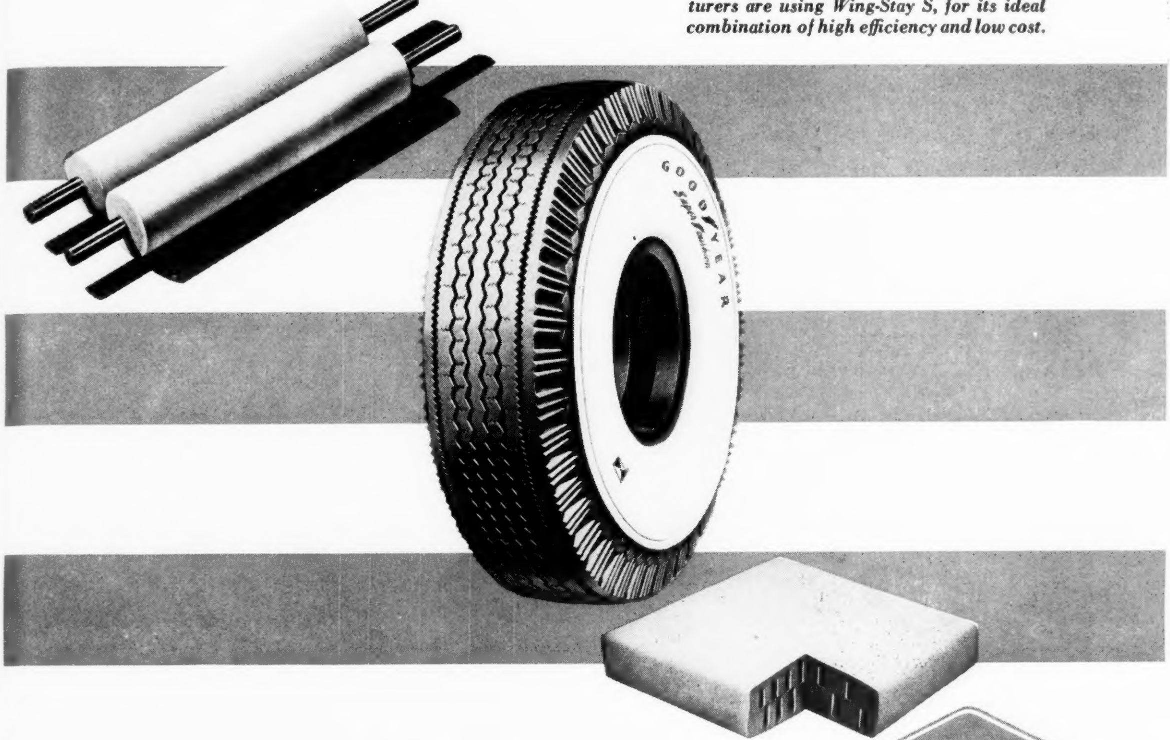

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August, 1950

Volume 122 Number 5

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RUBBER WORLD

Volume 122 New York, August, 1950 Number 5

The Manufacture of Rubber Footwear

W. E. Glancy[1]

Fig. 1. Five Standard Types of Rubber Footwear

THOSE rubber footwear companies which are long established have certain accepted methods of production which represent development over the period of their existence. Other companies which do not have this background may be manufacturing footwear through the exploitation of new ideas and inventions, and usually these companies make no attempt to cover the wide line which the larger and older footwear companies find necessary in order to give service to their dealers and customers. Rather, these newer companies limit themselves to products such as light shoes made by dipping lasts in compounded latex or to molded rubber and canvas shoes.

Still another line which has appeared is one of waterproof shoes for children—this line is based upon polyvinyl chloride plastisol techniques. Another recent development is a heat-sealed vinyl sheet which has been fashioned into protective splashproof footwear for women. Not only does the manufacturer of conventional footwear need to determine the inherent quality of these new types of footwear, but he must also consider other shoes made by a combination of fabricating and dipping methods.

The methods which have been developed for these special items are not of industry-wide application, and much of the equipment that has been designed and constructed for these new lines has been the work of the rubber goods manufacturers. Circulating tanks for latex mixes, dipping machines, drying ovens, and heat-sealing apparatus are examples of such equipment.

Conventional Footwear Lines

Conventional lines of footwear are made in plants which utilize heavy mixing equipment such as may be found in most large rubber manufacturing units, but from there on equipment is more specific to this type of product.

A comprehensive line of footwear will include shoes for men, women, and children for a multitude of purposes and in numerous styles, colors, and sizes to fit leather shoes. Included among these are boots for fishing, mining, and farming, light waterproof footwear for city wear, dress gaiters and galoshes, women's fur-trimmed gaiters, heavy-duty Arctics and gaiters, hunting pacs, mining shoes, athletic and basketball shoes, etc.

Before these shoes are fabricated many parts must be prepared, and accessories such as buckles, eyelets, and raceways are assembled and attached to other parts. Molded heels for boots necessitate presses and molds and a molding room.

All of this footwear must be fashioned over lasts. Hence there is the need of storage of lasts, bars to support these lasts during transportation and vulcanization, trucks to carry the bars with mounted lasts, and a foundry to provide new lasts necessary for building the new shapes and styles of shoes which the trade demands.

Cloth parts such as are used in canvas footwear and some specialty shoes are stitched to combine quarters, counters, and trim stock. Hence a stitching room is needed with numerous sewing machines, each of which is selected for the specific operation required.

Rubber cements are churned in equipment usually segregated from the rest of the plant. A spreader house is located nearby, and the spreaders are particularly

[1] Development manager, Hood Rubber Co., a division of The B. F. Goodrich Co., Watertown, Mass.

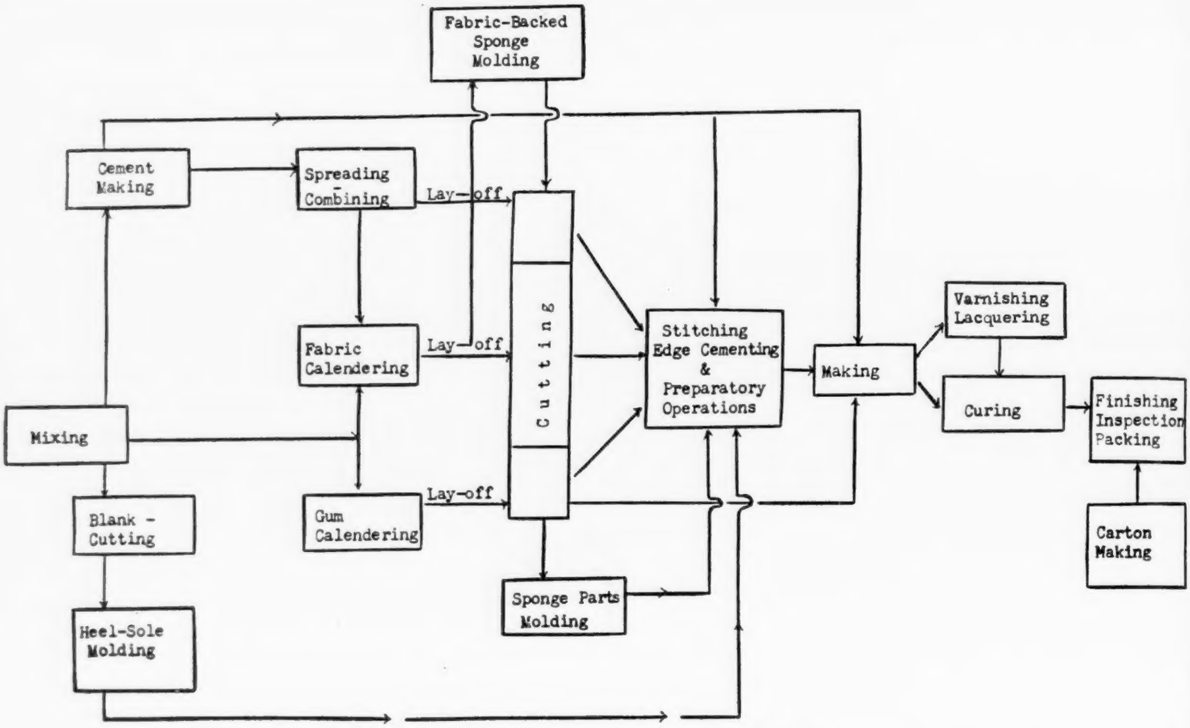

Fig. 2. Composite Flow Chart for the Manufacture of Rubber Footwear

necessary for the coating of stretchy fabric such as light cotton nets.

The design of rubber footwear involves the use of special engraved rolls for upper and outsole stocks as well as for other gum pieces such as binds, foxings, and trim stock. An engraving room is equipped for this work.

Another accessory service is that of die making. Each new item is made from patterns which have been developed by the pattern maker, but when production is due, metal dies must be available for each part.

Canvas shoes are assembled with natural rubber and latex adhesives. Some concerns may purchase these adhesives already prepared, but if the shoe manufacturer is to make his own, special equipment is required. Latex mixing tanks, colloid mills, rotators, and high-speed stirrers are commonly used.

Most footwear is packed in individual cartons for each pair of shoes. The making of these printed cartons for a large footwear manufacturer is a business in itself. Such cartons must be scheduled to fit into the daily production needs, and, accordingly, equipment for cutting, fabricating, and printing of cartons and covers must be provided.

It may be surmised that in order to have smooth production it is necessary to bring all parts which go into any particular shoe to the right place at the right time. When the magnitude of the problem of preparing the parts necessary to make a large volume and variety of shoes is appreciated, the question will be raised as to how this scheduling of operations is carried out. To do this it is necessary to have a centralized scheduling department which issues printed forms that are followed to provide for all operations from the beginning of the mixing of stock to the final packing and shipping. In back of this scheduling operation it is of course necessary to have complete construction records.

Some five types of rubber footwear may be considered in order to trace through the operations required to manufacture each type of footwear. The first of these, and the simplest, is a men's low waterproof shoe termed a "clog." This shoe requires six processed fabric parts and seven gum parts, and as is the case with other shoes, certain parts such as outsole, insole, and sole-form must be cut for lefts and rights and in a range of sizes.

The second type of shoe is known as a "Weather Boot." It is made in three different colors for children and young women. It has a pocket to ease putting on and taking off and a strap to tighten it at the top. This boot has 16 parts of fabric and seven gum parts. In addition are five sundry parts such as buckles and rivets.

The third shoe is a boy's low boot described as a "Rocket Boot." This comes in two colors and has 12 fabric parts and eight gum parts besides four accessories such as buckles, eyelets, and grommets. The exterior of this shoe, like the two previous shoes, has a lacquer coat.

The fourth shoe is a women's "Kick-Off" with electrified shearling cuff and talon fastener with fleece lining. This shoe is made in four different colors. It has 11 fabric parts and nine gum parts in addition to accessories such as talon fasteners and the beaver cuff.

The fifth shoe is a "Lace-to-Toe" canvas shoe made in two colors for boys, three for men, and in white only for women. It contains the sponge cushion heel and arch support. This shoe has 12 fabric parts and eight gum parts. Also included are nine sundries such as webbing, eyelet, tape, and binding.

Each of these shoes is illustrated in Figure 1.

The parts used in these shoes differ in detail, but the basic operations of building are much the same, as will be observed in the accompanying chart. (Figure 2.) These basic operations will now be described.

Basic Manufacturing Operations

A calendered outsole is common to all of these shoes. The thickness of this part will differ from type to type, but it normally will be heavier than other parts of the

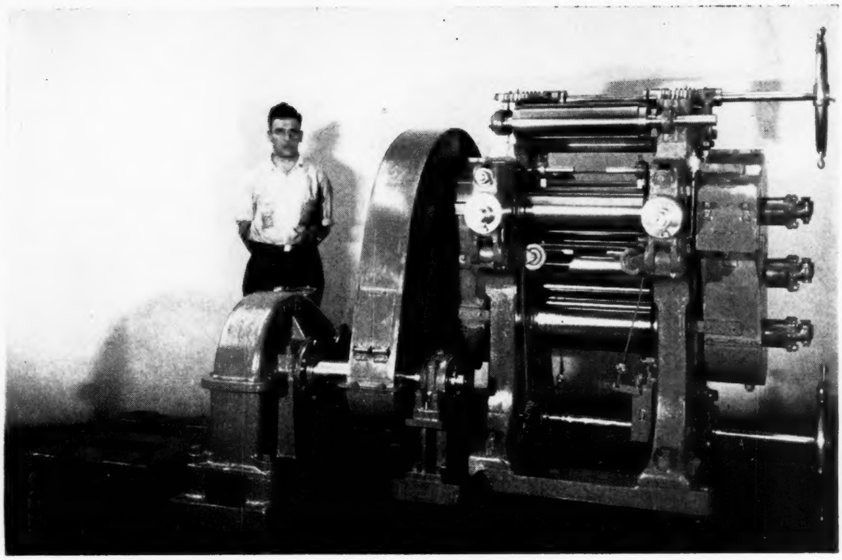

Fig. 3. Farrel-Birmingham 10- by 20-Inch Outsole Calender: Three Rolls in Stack, and Fourth Roll Offset. Offset Roll Is Engraved at Footwear Manufacturer's Plant

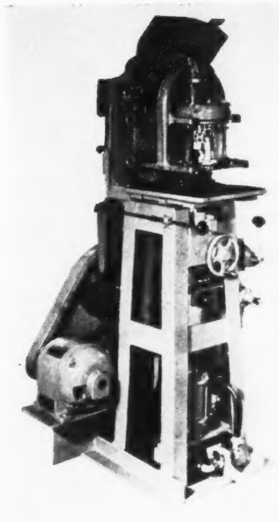

Fig. 4. Wellman Rubber Outsole Cutting Machine

shoe and, consequently, is formed on a rugged narrow type of calender called an outsole, calender. An engraved roll in off-set position at the top gives the outsole design. Such a machine is illustrated in Figure 3. It may be expected that stock which is calendered to such thickness will be more difficult to control than if it were thinner, and elaborate precautions are taken to keep the thickness within reasonable tolerances, and proper temperature and plasticity conditions are maintained. The engraved roll is one of numerous rolls which carry different designs and are interchangeable in the calender.

Calendering, Spreading, and Cutting

The calendered sheet is cut into lengths of about three feet, and these are booked for transportation to the cutting room. The soles to be cut from these sheets are, in most instances, cut on a Wellman machine. This is an ingenious device which is adjustable to give the sizes required. A sharp blade is guided around the contour of a plate designed to give the right shape and size, and this cutting is carried out at an angle so as to give a skived edge which facilitates the turning of the edge of the sole upon attachment to the body of the shoe. This makes a better fit, and there is less tendency for "started" soles during vulcanization. This machine is shown in Figure 4.

Three or more pairs of outsoles are usually obtained from each sheet, and the excess material is returned as "scrap" for re-running.

Outsoles for some other types of shoes such as the "California" or "casual" sandal lines which do not require the same type of rolled edge are cut on a clicker machine, power-driven, which applies a blow to a flat die to cut through the calendered gum. (See Figure 5.)

Thin, all-gum stocks such as are used for uppers are first calendered to proper thickness on an upper calender. Such a calender is somewhat wider than an outsole calender. It is usually of four-roll construction, and the fine design on a calendered upper stock is produced from the engraved offset roll. Plain sheet is produced on the same calender when the plain roll replaces the engraved roll. The production superintendent is very insistent that the gum furnished is of the proper processing characteristics so that he will have a minimum of delay.

This thin calendered stock is carried on a conveyer belt to a point where it can be stored for cutting into uppers and other smaller parts. This operation may involve running the sheet into reels or depositing lengths on long cloth frames or of direct machine cutting of the sheet. Calendered stock which is stored in reels or on frames is cut into parts by either handle die cutting or hand cutting around metal patterns. These two latter methods are chosen more especially for low-production items. The cut parts are stored in books to be made available for the next operation.

To stick cloth linings and other parts to exposed calendered gum, it is usually necessary to give the fabric a coat of cement applied on a spreader[2] and then a heavier coat on a coating calender. This is a large three-roll calender, and instructions on plasticity of gum, temperature, and speed of calender are essential.

Other parts of rubber shoes which are not intended to stretch, but used to give support and maintain shape are based upon square woven fabric. In waterproof shoes such fabric is frictioned, i.e., given a minimum coat of gum, sometimes on both sides, sometimes on only one, and this gum is pressed into the interstices of the fabric by a calender set for friction motion. Sole forms, friction heel pieces, and toe pieces are examples of such parts. The spreading, frictioning, and calendering of cloth entail a means of preventing the sticking of rolls of the material and parts together. Therefore dusting powders, cloth liners, and treated paper separators are used for this purpose and constitute a large expense.

A canvas shoe such as the Lace-to-Toe type mentioned above has a drill-backed army duck upper. These two fabrics are doubled on the spreader, and ventilation through the fabric is obtained by leaving spaces for the air to pass through.

All of these cloth parts are cut from the rolls of rubberized fabrics, and this cutting is done chiefly on clicker machines or Parsons machines. Many calendered stocks are laid on tables, and piles of cloth built up to a practical height so that when parts are cut on a Parsons machine or clicker, as many plies are cut at one time as possible.

[2] A description of spreaders and roll coaters appears on pages 295-298, 300 of our June, 1950, issue. EDITOR.

Waste from cutting operations which is found in every rubber footwear plant usually finds its way back into a shoe as a filler.

Fabrication on Conveyers

The fabrication of parts into finished shoes offers great opportunity for the methods engineer. The day of the individual shoemaker as well as of the table fabrication method has about disappeared. Rather, operators work in teams with the mechanical help of conveyers which bring the work to the individual. Operations such as cementing, bonding of cut cloth to gum, attaching buckles, and stitching trim stock are largely completed before assembly of the parts on the last. The freshening of stock by swabbing solvent over the surface is a common operation to improve union of gum to rubberized fabric or of gum to gum. It is often observed that powders such as starch or zinc stearate are spread on the surface of a stock to minimize scrap losses, and at a subsequent point the powder is removed to facilitate fabricating.

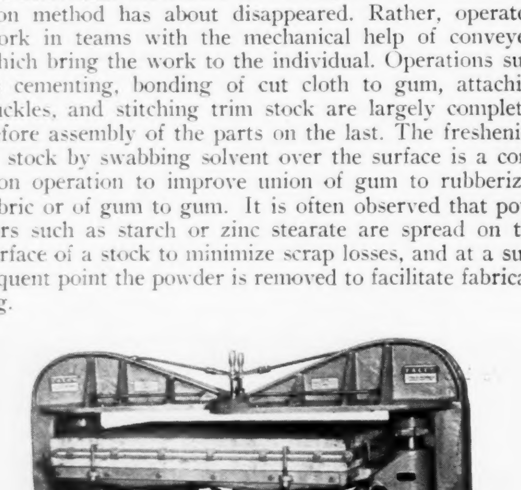

Fig. 5. Fales Twin Style "B" Clicking Machine

Sponge insoles and arch supports which are very generally used in canvas shoes are made from molded sponge. The assembly of sponge parts, insole, and cover is made on a conveyer; then the assembled insole is applied to the shoe by the operator at the conveyer.

Conveyers used for the assembly of footwear vary in many details. Some conveyers are of the endless-chain type with jacks conveniently spaced and speeds so reduced that the operators can work on the shoe while the last is held on the jack. Such conveyers work well with a diversified production schedule. Belt-type conveyers have also been successfully operated. Long belts permit larger groups of operators to work on mass-production items. Here, the last is removed from the belt by the operator as the different parts are applied and then put back for conveying to the next operation.

One advantage of the smaller chain and jack conveyers is that the individual team members may be made more quality conscious.

Most of the experienced operators are women who have nimble fingers and who show great dexterity in the application of parts to the shoe in the course of making. Mechanical helps in the form of power-driven rolling or doubling machines, lasting machines and presses are used. A lasting machine appears in Figure 7. Methods applicable to any one shoe may not be suitable for another, but in general the operators' duties consist of pulling an upper (with lining bonded to it) over the last, attaching this to an insole which is properly located, and then applying other parts such as fillers, toe pieces, heel pieces, stays, foxings, and outsole. Canvas shoes are stuck together with cements, and the application of these cements to the proper areas, while the lasted shoe is passing slowly by, is an operation of considerable skill. Likewise, the successful positioning of the gum parts requires a costly training period for the operators.

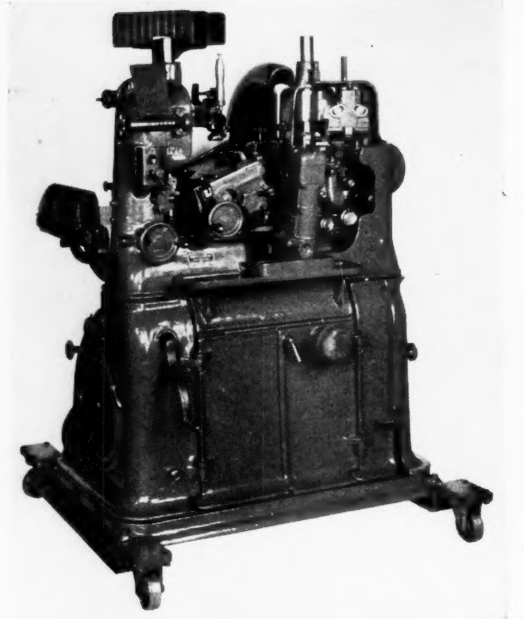

Fig. 6. United Shoe Machinery Corp. Lasting Machine

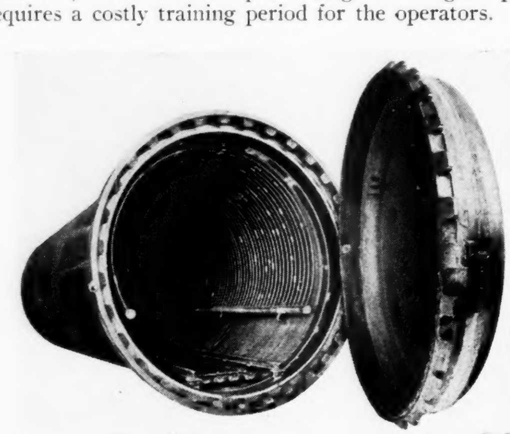

Fig. 7. Adamson-United Footwear Vulcanizer

The last operation at the conveyer is that of rolling, stitching, and pressing the edges of the outsole. The completed shoe on the last is placed on a truck, and each shoe is examined by a trained inspector who is expected to catch any imperfect work and possibly make repairs before the shoe is advanced to its next position.

Finishing

A generation ago a large proportion of waterproof footwear was of bright finish which was obtained by immersing the shoes into a tank of special varnish. A relatively small proportion of light footwear is still treated in this way. The varnish may be purchased from special-

ists among the paint and varnish makers or manufactured by the footwear producer. A dipping machine is used to dip the shoes while they are mounted on a bar. This procedure permits the varnish to drain smoothly.

As mentioned above, most other bright-finish waterproof shoes are now lacquered. This development has become possible through the formulation of lacquers designed especially for rubber footwear. Spray booths and adequate ventilation are necessary for this operation.

Vulcanization

Vulcanization of rubber footwear is carried out in large pressure-type vulcanizers in contrast to the early-type box heaters operated at atmospheric pressure. The perfection of these vulcanizers and the engineering knowledge of ways of obtaining uniformity of temperature by circulation have meant much to the general high quality of rubber footwear. As the manufacture of rubber footwear has been built upon developments within each company's organization, there is probably no uniformity in the design of vulcanizers or in the type of heats required. Some footwear is vulcanized in circulating hot air under a pressure of about 30 p.s.i. Other footwear is cured in dry steam. The length of heat will normally run 60 to 120 minutes. A dry steam vulcanizer such as is used for vulcanizing rubber footwear is shown in Figure 7.

After vulcanizing, the shoes are stripped from the lasts, in many cases with the aid of compressed air. Some shoes are so constructed that they must be cut from the lasts. This operation must be skillfully performed, or damage and seconds will result.

Inspection and Packing

In the inspection and packing department certain finishing operations such as trimming above the bind must be carried out. Machines with circular knives have been developed which will permit a very rapid operation. Other operations such as machine setting of snaps and the stitching of fur cuffs occur after vulcanization and are performed in this department.

Inspection and packing require a large department, and here again the work is done largely by female operators. Cartons, tissue paper, shoe laces, and other findings are delivered to this location as required. Conveyer belts for carrying the work to the operator are carefully engineered, and as the packed cartons leave the belt, they are placed into shipping cases properly ticketed, ready for warehousing or shipment.

An important part of the work of the packing room is the preparation of daily reports on quality. In our plant the number and types of seconds are carefully reported and classified so that on the following day technical service and production men are each striving to remedy any troubles or to keep them at a minimum.

Summary and Conclusions

This discussion of the manufacture of rubber footwear is necessarily restricted in scope, but these observations have probably been sufficient to bring out the complexity of the business from the manufacturing point of view. An ever-changing market means a changing product. Price considerations which were most difficult before the war are again of great importance. Open winters and foreign products with low-cost labor constantly keep the American manufacturer on the alert for worthwhile savings.

Material costs show little indication of reduction. Textiles have remained high with government supports for cotton and with labor costs being also maintained at a high level. With the availability of American synthetic rubber and reclaimed rubber, the rubber footwear technologist has always the possibility of using many combinations.

Another problem under constant study is that of transportation of materials. This industry is unique with regard to the practice of storing and transporting millions of unvulcanized perishable parts from one department to another. This involves a great amount of bulky equipment and heavy expense.

A brief reference has been made to the rubber chemist, the engineer, and other technologists. Large advances have been made over the years by these trained men as has been the case in other branches of the rubber industry. Compounding, processing methods, vulcanizing, setting of labor standards, motion-time study, quality standards—all of these fields have been cultivated by the management and technical staffs of the footwear manufacturers, and it is chiefly through their efforts that high-quality products have been made at as low costs as are consistent with the current high prices of materials and labor.

Sole Crepe in Indo-China

LESS is probably known about activities of rubber companies in Indo-China than of any of the other important rubber centers in the Far East. The article on the production of sole crepe in Indo-China, appearing in *Cahiers I.R.C.I.*,[1] published by the Rubber Research Institute of Indo-China, reveals that the first rubber company in Indo-China to manufacture sole crepe was Soc. des Heveas de Tayninh, which decided to enter this field in 1929 and after a period of preparation began production on a small scale in 1932. The output in that year came to 7,630 kilograms and increased to 39,641 kilograms by 1935, all of which was absorbed by the local market. However, as the fad for crepe soles died down and, moreover, the local product did not quite meet European demands, production was halted in 1936 and 1937. Then interest in crepe soles revived, and after the events at Munich, demand, especially by the French army, increased to such an extent that in 1940 S.H.T., still the only manufacturer of the material in Indo-China, produced 274,571 kilograms.

In 1943, Michelin and Société des Plantations des Terres-Rouges (S.P.T.R.) entered the field, and the following year also did Plantations de Cau Khai and Société Indochinoise de Plantations d'Heveas (S.I.P.H.). Total output of sole crepe in 1944 amounted to 1,440,080 kilograms, of which S.H.T. accounted for about 74%.

As more and more local companies began manufacturing sole crepe, the lead of S.H.T. narrowed till by 1947, when total production was 3,805,630 kilograms, the concern supplied 1,003,519 kilograms, and just managed to remain in first place. But the following year destruction of part of its factory caused it to fall behind in production, and at the end of the first half of that year, the S.P.T.R. was ahead with more than 24% of the total output of the period to its credit. In the first half of 1948, average monthly output came to about 500,000 kilograms, produced by about a dozen different companies.

Exports of sole crepe totaled 2,254,453 kilograms in 1947 and 1,579,165 kilograms in the first half of 1948. All but a comparatively small proportion of the shipments of sole crepe goes to France and French countries. In 1947, Hong Kong was the chief foreign purchaser, taking 204,001 kilograms, but in the 1948 period consignments for Hong Kong dwindled to 10,767 kilograms.

A certain amount of the sole crepe is bought up by native manufacturers and craftsmen for local consumption—probably not more than about 500 metric tons annually.

[1] IV, 29 (1949).

The Angle vs. the Crescent Specimen for Determining Tear Resistance

F. L. Graves[1]

TEARING has been ably defined by Busse (1)[2] "as the formation of new surfaces by the application of a small force in such a way that it is concentrated at the tip of a sharp indentation, or cut, in the sample." If the magnitude of this small force could be determined conveniently, a measure of true tear resistance would be obtained.

Unfortunately it has not been practical to isolate true tearing forces in tests for extensible materials. Compromises have been necessary wherein forces not associated with true tear resistance are reflected in the loads required to rupture specimens. Because of the composite nature of such measurements their ability to reflect true tear resistance varies with any change in specimen shape that affects stress distribution.

Since, in service, tearing occurs under a wide variety of stress distributions, it would be unrealistic to defend any particular example as most representative. It is because of this point that direct correlation with service remains elusive. The importance of information obtained in laboratory evaluation of compounds, however, can be greatly enhanced through the use of specimens whose stress distributions emphasize the stress at the point of tearing.

Lefcaditis and Cotton (2) observed that in the crescent specimen (ASTM dies A and B) too great a proportion of the pulling force is distributed throughout the test piece, while only a small part is applied at the point of tearing. As a result the loads obtained on a dynamometer are excessively influenced by the modulus or stiffness of the material.

The angle tear specimen (3) (ASTM die C) was designed for an increased stress gradient to provide greater concentration of the pulling force at the point of tearing, thereby reducing the influence of those forces not directly concerned with tearing. Elimination of the razor nick resulted only incidentally in a significant improvement in reproducibility (3-4). Referring to Figure 1, the comparative stress gradients of the two specimens can be visualized from deformation of the grid lines of each under a load of two pounds.

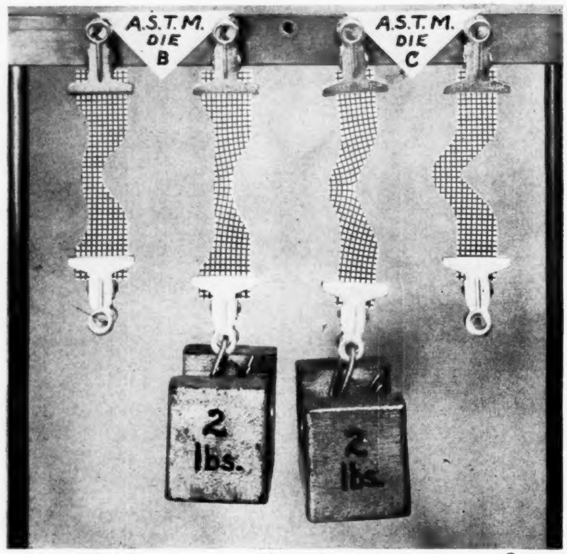

Fig. 1. Comparative Stress Gradients of Crescent vs. Angle Specimen under Two-Pound Load

The angle specimen was adopted by the ASTM in 1948 as an alternate design in Method D-624 and has since been gaining acceptance both here and abroad. Perhaps its most outspoken critic has been J. M. Buist (5-7), of Imperial Chemical Industries in England. The balance of this brief paper is in the nature of rebuttal to some major observations taken directly from Buist's papers. Because of the necessary brevity employed here it is recommended that readers not familiar with Buist's work refer to the complete text.

Buist (5): "In a previous paper (8) detailed reasons were given why tear resistance results with the ASTM test piece (crescent) should be expressed in kilos/cm^2 or lbs./in.^{2} and not in kilos/cm or lbs./in. As the width of the test piece is 0.4-in. (1.016 cm.), there is practically no difference in the numerical value when expressed in kilos/cm^2, but the order of the results is completely changed when expressed in lb./in.^{2}."

Answer: If width of specimen is not changed, as is normal practice, this point means no more than inclusion of a constant in the calculations and therefore adds nothing to the present method in the relative rating of materials. Since in tear testing the load is not distributed uniformly over an area, the present practice of expressing load as lbs. per unit thickness, which does not imply any particular stress distribution, is to be preferred.

Buist (5): "As the angle and crescent test pieces are of different width, the author (3) is not justified in comparing results expressed as lb./in. The results must be corrected for the difference in width."

Answer: No attempt was made to compare these values in a quantitative sense. Comparisons were made, however, of the effects of treatments on tear resistance as revealed by the two methods. Quantitative comparisons cannot be made between specimens having different stress gradients by the simple expedient of considering width of the specimens in an area calculation.

Buist (6): "The test using the nicked crescent specimen is a measure of tear propagation of the initial nick. The test using the angle specimen is a combination of tear initiation and tear propagation. Since only the overall force required to rupture the specimen is measured, it cannot be analyzed into the components producing initiation and propagation."

Answer: Owing to the same profile characteristic observed by Newman and Taylor (9) in die-cut specimens, the base of the angle in the angle specimen is not normal to the major surfaces. Early in stretching, the higher stress concentration at one side of the apex of the angle causes a stress-equalizing tear to occur which

[1]American Cyanamid Co., Stamford. Conn.
[2]Numbers in parentheses refer to Bibliography items at end of article.

Compound	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Tensile strength kgs/cm²	253	244	184	157	191	255	264	239	169	171	150	135	118	84	79
Unnicked crescent tear, kgs./cm²	218	220	180	149	136	223	219	214	127	132	117	109	94	76	68
Crescent tear, 0.02 in. nick, kgs/cm²	160	111	72	100	50	172	153	162	74	77	72	70	63	54	44
Angle tear kgs/cm²	110	62	35	65	30	107	100	101	37	39	39	41	36	36	37

Compound 1 = natural rubber tread
2 = Neoprene GN tread
3 = GR-S tread
4 = Butyl tread
5–8 = increasing loadings of Kosmobile HM in natural rubber
9–15 = increasing loadings of Winnofil in natural rubber

normalizes the base of the angle. The force required to produce this preliminary nick in no way complicates the value observed later at rupture. On the other hand, owing to crystallization and other influences which produce knotty tears, rupture of the crescent specimen is not always a propagation of the original nick. Tear initiation or propagation cannot be considered a characteristic of one specimen over the other.

Buist (6): "It is sound to argue in favor of a specimen where the stress at the point of tearing exerts the dominant influence on the tear resistance, but the claim that the angle test piece meets this requirement cannot be substantiated."

Answer: When the stress gradient is increased, a greater proportion of the pulling force is concentrated at the point of tearing. That this concentration exerts the dominant influence on the value obtained as tear resistance is substantiated in testing the effect of oven aging for 24 hours at 100° C. on a natural rubber tire tread stock. Using the crescent specimen, this treatment is found to improve tear resistance by about 6%. Few rubber technologists would recommend oven aging to enhance this property. The angle specimen, less affected by changes in stiffness, reveals that this oven aging cycle reduces tear resistance by about 35%.

Buist (6): "With semi-reinforcing white fillers the angle test piece tends to develop a large number of very pronounced knotty tears."

Answer: Buist discusses at length the contribution of the stress distribution in the angle specimen to knotty tearing. The table which he presents is reprinted below. The totals have been added.

COMPARISON OF NUMBER OF STRAIGHT AND KNOTTY TEARS

Filler	Crescent Tear		Angle Tear	
	Straight	Knotty	Straight	Knotty
Whiting	90	..	90	..
China Clay	90	..	90	..
Zinc oxide	..	90	15	75
Calcene	..	90	10	80
Winnofil	..	90	..	90
Kosmos 20	76	14	75	15
Magecol	32	58	30	60
Kosmobile HM	25	65	63	27
Totals	313	407	373	347

There is apparently no need to consider knotty tears in a discussion of the relative merits of these specimens. Knotty tears destroy the stress gradient designed into any specimen and create new gradients which are unique for each individual test. When such materials are tested, the most reliable information is obtained by recording the load at the moment of initial tear travel. When the test is continued beyond this point, there is very little concentration of the pulling force at the point of tearing and, as a result, very little reflection of tear resistance with both the crescent and angle specimens. The test does not, as Buist suggests, approach a direct tear test (Group I) (10) under these conditions.

The actual tearing forces involved in knotty tears are not necessarily any greater than those found for straight tears. The advantage in service of the former lies in their self-limiting or localizing effect which may in some instances prolong the service life. The *manner* of tearing as an *addition* to tear resistance is the asset in these compounds.

Buist (6): "The results in Table 3 show that the stress concentrations in the angle test piece are too high and that the discriminating power of the test has been reduced too far. There is a wide difference in tensile strength, unnicked crescent tear, and crescent tear of the Winnofil compounds; yet the angle tests give a more or less constant value. For these compounds, therefore, the angle test shows no discriminating power at all."

Answer: By either tear test the value recorded is no more than the summation of all the forces which prevail along the stress gradient at the moment of rupture. Since this composite value reflects not only forces active at the point of tearing, but also other forces somewhat removed from this point, it does not automatically follow, in compounds where the crescent data show greater spread, that greater discrimination in *tear resistance* has been achieved.

While in many compounds tear resistance is found to change with tensile strength, it is not necessarily the rule in stocks employing semi-reinforcing fillers where structural orientation may be complex.

The Table 3 referred to above is reprinted at the top of this page.

Referring to the Winnofil compounds Nos. 9 through 15, it will be noted that No. 10, having the maximum tensile strength, has a superiority of 116% over No. 15, of lowest tensile strength. Using an unnicked crescent specimen, which differs from a tensile specimen only by the introduction of a small stress gradient, we observe the first faint influence of tear resistance on the tensile measurement and the superiority of compound No. 10 over No. 15 drops to 94%. Nicking the crescent specimen provides a point for stress concentration, and we move farther away from the pure tensile test and see further influence of tear resistance in the values obtained. The superiority of No. 10 has now dropped to 75%. Using the angle specimen in which the tearing forces dominate, we find the superiority of No. 10 to be a barely significant 5%, and the maximum tear resistance appearing in compound No. 12 only 11% above No. 15.

The angle specimen has shown excellent discrimination in that it reveals Winnofil to have little effect on tear resistance, beyond the important contribution of providing desirable knotty tears.

Buist (6): "In point of fact, the angle test is only a severe tensile test, and the danger is that it may be too severe."

Answer: Since in the hypothetically perfect tensile specimen the force is distributed uniformly over the entire loaded area, it would probably be the least severe tensile test in the sense used by Buist. The ideal tear test would therefore be to us the exact opposite: namely, the most severe tensile test imaginable, where the force is concentrated at the apex of the tear and is causing cleavage along a line through the thickness of the specimen rather than being distributed over an area.

Only by concentrating the forces measured on the dynamometer at this point of tearing can we hope to reflect true tear resistance in the values obtained.

(*Continued on page* 539)

Effect of Carbon Black on Heat Transfer Characteristics of Vulcanizates[1]

L. R. Sperberg,[2] Lynn Harbison,[3] and J. F. Svetlik[3]

SINCE the technology of rubber is concerned chiefly with processes that involve the heating and cooling of rubber mixes, the capacity of a rubber composition to conduct heat is very important. The problem of heat transfer is one of paramount interest to the man charged with the responsibility of seeing that stocks handle satisfactorily in the factory without undergoing incipient vulcanization. It is of equal concern to the technologist responsible for compounding stocks which must vulcanize to a certain cure state in a given time. It is a problem of prime importance to the men who design tires, formulate the various stocks to be used in their construction, and determine the proper curing cycle to insure that they will not fail because of their inability to dissipate the heat generated as a result of the flexing action encountered in service.

Despite this great interest in the thermal properties of vulcanizates, and although a tremendous amount of work is expended each year in the study of the vulcanization reaction, a cursory literature search reveals that surprisingly little work has been published recently on the heat transfer characteristics of vulcanizates. Barnett[4] and Frumkin and Dubinker[5] conducted rather extensive investigations on the heat conductivity of rubber mixes, but the results of their work have been largely ignored by present-day rubber technologists. More recently, Hall and Prettyman[6] have discussed a method for determining the heat transfer characteristics of vulcanizates, but they reported only a few typical results for a limited number of rubber compositions. Rehner[7] has presented a more finite mathematical approach than that utilized by Frumkin and Dubinker and in addition has reported the heat transfer characteristics (thermal diffusivities) of various types of elastomers. Barnett and Frumkin and Dubinker have reported the effects of various types of carbon black on heat transfer characteristics, but since this work was done several years ago, information is not available on many new blacks which have developed in recent years.

Since carbon black is the chief pigment used for reinforcing all types of elastomers, it was felt that a study investigating the heat transfer characteristics of rubber mixes containing variable quantities and types of carbon black might be helpful in throwing light on a few of the problems relating to the transfer of heat in vulcanizates.

Scope of the Work

The typical tread formulation shown below was used for preparing the specimens.

Material	Parts
GR-S	100
Black	50 (or as shown)
Softener	6
Zinc oxide	3
Sulfur	1.75
Santocure	0.80

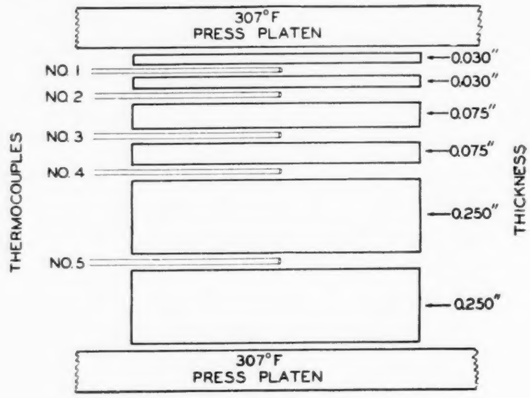

Fig. 1. Sketch of Test Setup

The following blacks and black loadings were studied:

Classification	Black	Loading—PHR
Semi-Reinforcing Furnace	Gastex	50
Conductive Furnace	Statex A	50
Conductive Channel	Spheron N	50
Conductive Channel	Voltex	50
Easy Processing Channel	Wyex	50
Acetylene	Shawinigan	10, 30, 50, 75
Medium Abrasion Furnace	Philblack A	10, 30, 50, 75
High Abrasion Furnace	Philblack O	50

A gum compound was included for comparison. The conductive furnace and channel blacks were included in this study because other investigators had noted previously that acetylene black, besides imparting excellent electrical conductance, possesses very good heat transfer characteristics, and it was of interest to the authors to determine if electrical conductance and heat transfer characteristics are related.

Test Procedure

The schematic drawing in Figure 1 illustrates the assembly of the rubber test block employed in this work. The thermocouples were placed between cured slabs of rubber, and the assembly was taped to provide the needed rigidity. By using slabs of varying thickness it was possible to measure the rate of temperature rise at various distances from the source of heat.

Testing was conducted in a steamheated press equipped with 24- by 24-inch steel platens maintained at 307° F. In order to prevent undue distortion of the test block when the press was closed, space bars of the same thickness as the block were employed.

Individual operators followed the change of temperature as recorded by each of the five thermocouples. Prior to inserting the assembled test block in the press all connections of thermocouple leads were made to the potentiometers. To insure no appreciable preheating of the specimens the test block was inserted into the press at the last moment, and the press closed as rapidly as possible. The starting point was taken at the moment the press was closed.

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[1] Presented before the Division of Rubber Chemistry, A. C. S., Detroit, Mich., Apr. 21, 1950.
[2] Present address, J. M. Huber Corp., Borger, Tex.
[3] Phillips Chemical Co., Bartlesville, Okla.
[4] *Ind. Eng. Chem.*, 26, 303 (1934).
[5] *Rubber Chem. Tech.*, 13, 361 (1940).
[6] India Rubber World, 113, 222 (1945).
[7] *J. Polymer Sci.*, 2, 263 (1947).

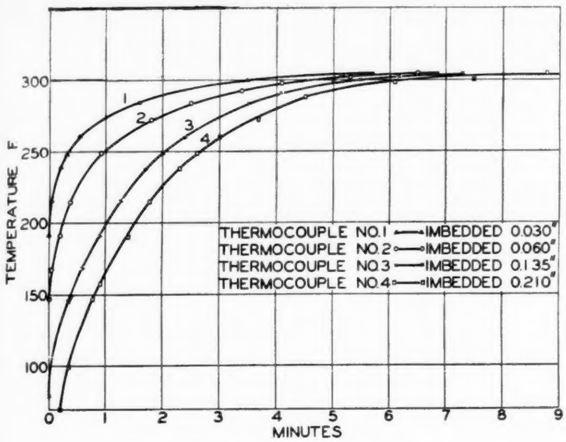

Fig. 2. Temperature *vs.* Time Curves

Method of Analyzing the Data

If the data are plotted to show the temperature rise with time for each thermocouple, curves of the type shown in Figure 2 are obtained. This method of handling the data was unsatisfactory because the room temperature, and therefore the test block temperature, varied between runs, and any calculations based on such curves would be affected by this variation.

A second method was utilized to eliminate the effect of variation of room temperature. In this method the attained temperature is expressed as the percentage of the temperature gradient existing at the time the test block is inserted into the press.

Typical calculations employed in converting the actual temperatures to a percentage of the temperature gradient are demonstrated in Table 1 for a thermocouple No. 1 at a distance of 0.029-inch from the heating platen.

TABLE 1. CONVERSION PROCEDURE

Impressed temperature...... 307.0° F.
Room temperature.......... 78.5° F.
Temperature gradient....... 228.5° F.

Min.	Temp. °F.	Increase in Temperature	Calculation	Attained Temperature % of Gradient
0	78.5	0	0 ÷228.5	0
0.5	261.3	182.5	182.5 ÷228.5	80.0
1	275.0	196.5	196.5 ÷228.5	86.0
2	289.4	210.9	210.9 ÷228.5	92.3
3	297.9	219.4	219.4 ÷228.5	96.0
4	302.0	223.5	223.5 ÷228.5	97.8
5	304.0	225.5	225.5 ÷228.5	98.7

When the temperature data are thus converted and plotted on semilogarithmic paper, a series of essentially straight line curves of the type illustrated in Figure 3 is obtained. As was mentioned previously, one of the obvious advantages of handling the data in this manner is that variations in room temperature from one test to another have no effect upon the relative thermal characteristics of any compound. Because of minor variations in thickness of the test slabs the data have to be replotted in the form shown in Figure 4 in order to permit making comparisons at equal distances from the heating surface and at equal percentages of the attained temperature gradient. From curves of this type it is easy to read for each stock the times required to attain different temperatures at variable distances inside the test block. To illustrate, data are cited in Table 2 to show the relative rates at which the gum stock and the Philblack A (50 phr) loaded stock attained temperatures of 60, 80, 90, and 98% of the temperature gradient at distances of 0.05, 0.10, 0.15, and 0.20 of an inch from the heating surface.

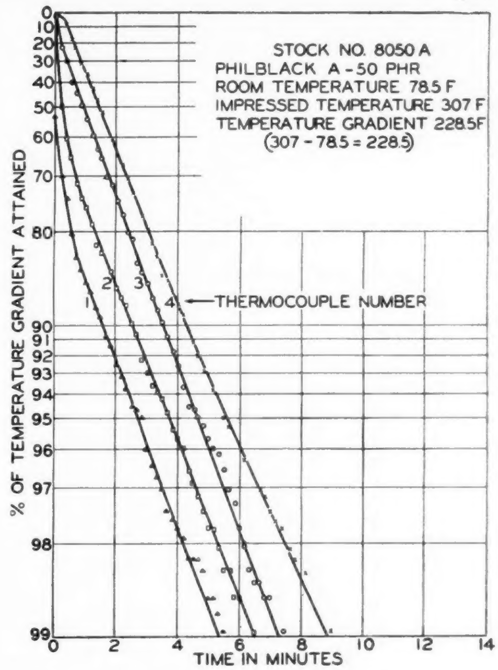

Fig. 3. Temperature Gradient *vs.* Time

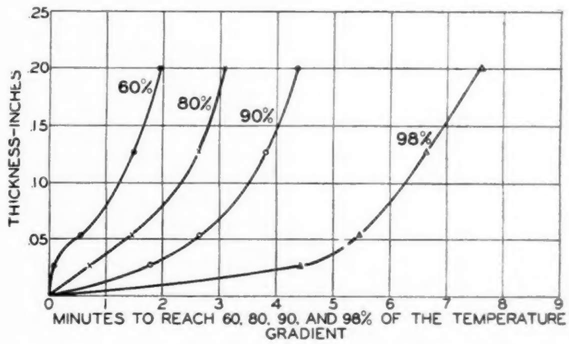

Fig. 4. Thermal Characteristics of Philblack A at 50 Parts Loading

TABLE 2. HEATING TIMES OF GUM AND PHILBLACK A (50 PHR) STOCKS

Attained Temperature % of Gradient	Minutes to Reach Attained Temperatures at Various Thicknesses 0.05"	0.10"	0.15"	0.20"
	Gum Stock			
60	0.60	1.90	2.74	3.22
80	2.47	3.96	4.72	5.26
90	4.39	5.90	6.80	7.42
98	8.92	10.54	11.53	12.42
	Philblack A (50 PHR) Stock			
60	0.38	1.04	1.53	1.79
80	1.38	2.28	2.75	3.06
90	2.56	3.50	4.00	4.36
98	5.35	6.30	7.00	7.60

If the Philblack A stock is arbitrarily pegged at 100%, the relative thermal characteristics (conductivity and heat capacity) of the gum stock may be readily calculated. These data are shown in Table 3.

TABLE 3. RELATIVE RATINGS OF GUM STOCK COMPARED TO PHILBLACK A (50 PHR) STOCK

Attained Temperature % of Gradient	Comparison at 0.05"	0.10"	0.15"	0.20"	Average
			% Ratings		
60	63.3	54.8	55.9	55.6	57.4
80	55.9	57.5	58.2	58.1	57.4
90	58.4	59.3	58.9	58.9	58.9
98	60.0	59.7	60.6	61.1	60.4
				Grand Average	58.5

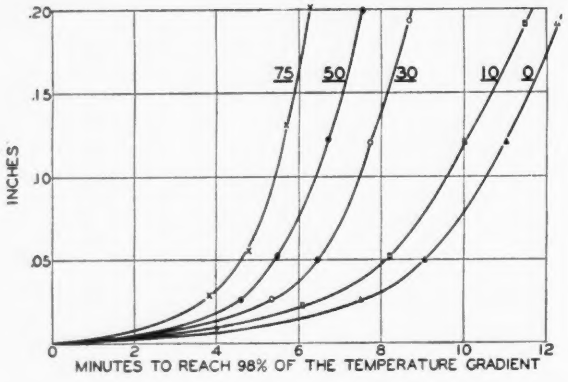

Fig. 5. Effect of Philblack A Loading upon Thermal Conductivity

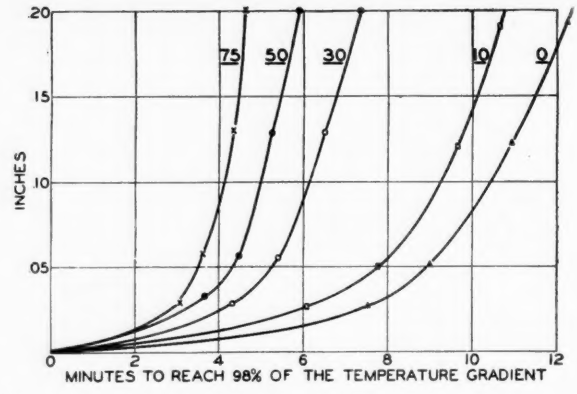

Fig. 6. Effect of Acetylene Black Loading upon Thermal Conductivity

It is obvious from the data that regardless of the stage in the heating cycle the gum stock is compared to the Philblack A stock, the relative rating remains the same. As a consequence of this fact, the thermal characteristics of any compound may be compared to any other in an abstract fashion without regard to impressed temperature, room temperature, thickness of specimen, or actual attained temperature.

Discussion of Results

Shown in Table 4 are the relative thermal characteristics of the different carbon blacks all compared to the 50 phr Philblack A compound arbitrarily pegged at 100%.

TABLE 4. RELATIVE THERMAL RATINGS OF VARIOUS CARBON BLACKS

Black	Black Loading—PHR				
	0	10	30	50	75
MAF (Philblack A)	58.5	63.3	82.6	100.0	119.6
Acetylene Black	58.1	68.1	101.9	127.8	160.5
SRF (Gastex)	....	....	....	93.6	....
CF (Statex A)	....	....	....	93.6	....
CC (Spheron N)	....	....	....	78.2	....
CC (Voltex)	....	....	....	80.4	....
EPC (Wyex)	....	....	....	83.9	....
HAF (Philblack O)	....	....	....	99.9	....

A graphic illustration of the thermal characteristics of the different stocks is shown in Figures 5, 6 and 7. These data indicate that (1) furnace blacks are superior to channel black, (2) MAF and HAF black both possess the same heat transfer characteristics, (3) heat transfer improves with an increase in black loading, and (4) heat transfer is apparently improved with an increase in the structure characteristics of the black.

During the course of the investigation the question arose as to the efficacy of the method employed, and it was suggested that a better technique would be to supply heat from only one side. Consequently the work was repeated, using an arrangement similar to that illustrated in Figure 1 except that an asbestos pad (0.75-inch) was inserted between the bottom press platen and the rubber test assembly, and the test block was increased to a total thickness of 1.0 inch. Thermocouples were inserted at 0.030, 0.060, 0.135, 0.210 and 0.460 of an inch from the heating surface.

TABLE 5. RELATIVE THERMAL RATINGS OF VARIOUS CARBON BLACKS

Black	Black Loading—PHR				
	0	10	30	50	75
MAF (Philblack A)	58.9	63.6	76.9	100.0	118.1
Acetylene Black	58.9	68.0	96.8	127.8	159.2
SRF (Gastex)	....	....	....	89.0	....
CF (Statex A)	....	....	....	91.3	....
CC (Spheron N)	....	....	....	81.7	....
CC (Voltex)	....	....	....	85.9	....
EPC (Wyex)	....	....	....	82.8	....
HAF (Philblack O)	....	....	....	98.3	....

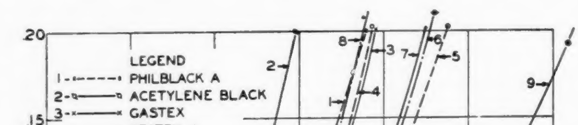

Fig. 7. Thermal Conductivity Characteristics of Different Blacks

When the data obtained by this procedure were treated in the same manner as discussed previously, the results shown in Table 5 were obtained.

These results are in good agreement with those obtained in the first test when heat was applied from two sides, and a smaller test assembly was employed.

When the work was repeated, it was noted that if a poorly conducting stock is backed by a highly conducting stock, the poorly conducting compound heats up more rapidly than if it were used alone. For example, if the test block consists of 0.5-inch of gum stock in contact with the heating surface backed by 0.5-inch of Philblack A (50 phr) loaded stock, the relative rating of the gum compound is increased from 58.9 to 71.2%. Similarly, the EPC black rating is increased from 82.8 to 87.8%, and the 10 phr Philblack A compound rating is increased from 63.6 to 75.0%. This condition would indicate the desirability of having a layer of stock with excellent heat transfer characteristics in the center of the tire at the juncture of the tread and carcass to promote faster and more uniform vulcanization of the tire.

It is known[8] that the degree of dispersion of carbon black in a rubber matrix has a profound effect upon electrical conductivity. In order to evaluate the effect of degree of dispersion upon thermal conductivity the present work was expanded to include black dispersion as a variable. The black dispersion was varied by changing the milling cycle. Compounds of each of the previously listed blacks having dispersion ratings of poor, good, and excellent were prepared and tested. Analysis of the

[8] L. R. Sperberg, J. F. Svetlik, L. A. Bliss, *Ind. Eng. Chem.*, 41, 1641 (1949).

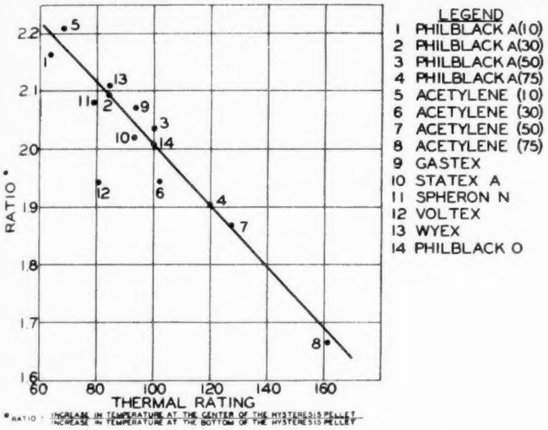

Fig. 8. Effect of Thermal Conductivity on Heat Generation

results shows the degree of black dispersion to have a negligible effect upon heat transfer characteristics. Thus no constant direct relation between thermal and electrical conductivity characteristics is apparent.

Effect of Thermal Conductivity on Internal Running Temperatures

The foregoing discussion has been concerned with the rate of heat absorption by rubber compositions with the heat supplied from an external source. Of equal, or perhaps greater, importance is the rate of dissipation of internal heat developed by articles in dynamic service.

If two stocks of equal inherent hysteresis, but of different thermal conductivity characteristics are compared in dynamic service, the poorer conducting stock should develop a higher internal operating temperature. In order to check this assumption, hysteresis pellets were prepared from each of the stocks tested in this study, and the heat generation was determined in the Goodrich flexometer. Equilibrium running temperatures were determined at the center as well as at the base of each of the test pellets. The ratio of the increase in temperature (over the surrounding oven temperature) at the center of the pellet to the increase in temperature at the base of the pellet should show some relation to the relative thermal ratings developed in the early part of this paper. The heat build-up data are shown in Table 6.

TABLE 6. HEAT BUILD-UP DATA

Black	Loading	△T °F. at Center of Pellet	△T °F. at Base of Pellet	Ratio △T °F. at Center / △T °F. at Base
MAF (Philblack A)	10	110.2	50.9	2.17
MAF (Philblack A)	30	126.5	60.3	2.10
MAF (Philblack A)	50	151.1	74.2	2.04
MAF (Philblack A)	75	186.2	97.8	1.91
Acetylene Black	10	109.0	49.5	2.21
Acetylene Black	30	139.3	71.6	1.95
Acetylene Black	50	162.7	86.9	1.87
Acetylene Black	75	192.9	116.0	1.66
SRF (Gastex)	50	144.3	69.8	2.07
CF (Statex A)	50	164.3	81.4	2.02
CC (Spheron N)	50	253.9	121.9	2.08
CC (Voltex)	50	179.1	106.6	1.95
EPC (Wyex)	50	157.0	74.4	2.11
HAF (Philblack O)	50	160.6	79.8	2.01

In Figure 8 the ratio of the increase in temperature at the center of the pellet to the increase in temperature at the base of the pellet is plotted *versus* the relative thermal rating, and it is obvious that an excellent correlation exists between the two properties. As a consequence of this relation, it is apparent that a rubber tread compound having high heat transfer characteristics will undergo less heat build-up in use than one having poor heat transfer characteristics.

Conclusions

Carbon blacks differ markedly in their effects upon overall heat transfer characteristics of vulcanizates. At 50 phr black loading the blacks tested are rated as follows in descending order of rate of heat transfer: Acetylene black, MAF (Philblack A) and HAF (Philblack O), CF (Statex A), SRF (Gastex), EPC (Wyex), and CC (Voltex and Spheron N). Lowering the black loading from 75 to 0 parts decreases the heat transfer rate, while the degree of dispersion of the black appears to have no effect on this property. If a poorly conducting stock is backed with a highly conducting stock, the poorly conducting compound heats up more rapidly than if it were used alone. This point is of importance in vulcanizing thick heavy items where a faster, more uniform cure can be obtained by inserting strips of highly conducting rubber into the fabricated item since such a mix will heat up more rapidly. The rate of heat transfer affects dynamic heat build-up, and specimens having high transfer characteristics dissipate the heat more rapidly than other specimens.

The authors wish to express their appreciation to the many people who contributed to the development of the data and to Esther Glendinning and J. A. Tallant for their many helpful suggestions in the preparation of the manuscript.

Angle *vs.* Crescent Specimen

(Continued from page 535)

Other observations in Buist's papers seem equally debatable; however, enough have been covered to illustrate our divergent interpretations in the evaluation of tear resistance in elastomers.

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New Cutting Block of Tygon

THE manufacture of a new product, the Colonial cutting block, made from tough vinyl-type Tygon plastic, has been announced by Colonial Rubber Co., Ravenna, O. The new cutting blocks are said to have an unusually long life, to be self-healing, and can be used on both sides. Production costs can be reduced on clicking and mallet cutting operations using the new blocks by stopping rejects from double cutting owing to "bounce backs," lengthening the intervals between die resharpening, and virtually eliminating die breakage.

The new blocks are suitable for cutting such materials as rubber, plastics, leather, cork, fiber, felt, cloth, paper, foils, or light-gage metals, with no danger of picking up chips or getting foreign material into the stock. Stocks of different colors can be cut without fear of cross-contamination. The blocks are available in two standard stock sizes: 20 by 20 by ⅜-inch (weight, seven pounds); and 18 by 36 by ¾-inch (weight, 22.5 pounds). Thicker sizes and blocks made to any desired durometer hardness are available on special order.

EDITORIALS

Too Little and Too Late, Again?

THE Administration and the Congress have had repeated recommendations from the rubber industry for increased synthetic rubber production, the establishment of a stockpile of synthetic rubber, and the lease or sale of synthetic rubber plants, but it was not until the outbreak of war in Korea that action was taken on even one of these recommendations. In late July, with GR-S stocks below a safe working level and with demand likely to be far in excess of current and future production until November 1 or later, government agencies charged with the responsibility of administering our rubber program finally also agreed that it was necessary to reactivate more than one GR-S plant, part of a Butyl plant, and one butadiene plant.

Before the fighting began in Korea, the shortage of synthetic rubber was emphasized by the complaints of certain rubber goods manufacturers who could not get enough to use for work on contracts for the Armed Services. As long ago as March the industry pointed out the very great value of a stockpile of GR-S in event of war, since a pound of GR-S would be just as valuable as a pound of natural rubber under those conditions. In June, P. W. Litchfield, chairman of the Goodyear Tire & Rubber Co., in a statement written without anticipation of the Korean trouble, urged the government to proceed at once to step up production of synthetic rubber to 50,000 long tons a month, and that it start the creation of a stockpile of 200,000 tons of synthetic rubber for possible national emergencies. Many similar recommendations were made by other industry leaders and The Rubber Manufacturers Association, Inc., during the last several months.

What were we waiting for, a full-scale world war before the government decided to collect on its "rubber insurance policy"? We might still find that the return on the investment will be too little and too late in terms of inflated military and domestic demands for rubber products.

Litchfield in the above-mentioned June report called attention to the fact that the nation's state of unpreparedness in the matter of rubber supply is in strange contradiction to other vast moves being made by the government to protect our national security. He also warned that statistically the rubber picture in this country is worse than was the case just prior to Pearl Harbor.

Fortunately, the chairman of the Senate Armed Services rubber subcommittee, Lyndon Johnson of Texas, recently changed his mind regarding the necessity of reactivation of government synthetic rubber plants and the accumulation of a sizable working inventory of GR-S, and was urging such action in conferences with officials of the Reconstruction Finance Corp. and other government agencies concerned with rubber.

Short-term leases of synthetic rubber plants under the Rubber Act of 1950, considered possible by Senator John Bricker of Ohio, who wrote the original Rubber Act of 1948, of which the 1950 version is an extension without major change, are still not possible if certain administrative and law interpreting agencies of the government refuse to accept the Bricker interpretation of the law he wrote.

With the present emphasis on war and rumors of war, the position of Congressional leaders concerned with the rubber program is also likely to become one of more instead of less opposition to release of government synthetic rubber plants to private industry.

As a "voice crying in the wilderness" on this point, India RUBBER WORLD would like to point out, however, that leasing a copolymer plant to private industry might provide a new source of synthetic rubber, possibly of a type differing to a greater or lesser degree from GR-S. A private firm might reactivate a standby plant for the production of such a new-type rubber in less time and with less drain on scarce raw materials than will be required for the GR-S plant. The work of the Phillips Petroleum Co. in the development of polybutadiene rubber is a case in point as far as new-type rubbers that may supplement GR-S are concerned. There may be other similar developments that might come to light if commercial production in a privately leased plant could be achieved. There should be no question of selfish commercial interest taking precedence over the national welfare since new synthetic rubbers would be available to all in the event of a major emergency, as they were in the last war.

The natural rubber supply/demand situation in this country is liable to become more instead of less difficult during the next several months. Booming domestic demand for rubber products plus new demands for the Armed Services will probably mean consumption in excess of new supply and a gradual depletion of stocks on hand. The Munitions Board semi-annual report on the stockpiling program calls for an acceleration of procurement and states that the natural rubber stockpile schedule for fiscal 1950 was "not met." Coupled with the demand for natural rubber at any price is the abnormally high price level reached on July 24 of 45¢ a pound for No. 1 RSS, which will have the effect of further strengthening the demand for the limited production and stocks of synthetic rubber.

As pointed out in this column in June, the government agencies have been woefully slow in reacting to the signs pointing to the need of greatly increased synthetic rubber production. If private industry is willing to lease a copolymer plant and develop to commercial production a new general-purpose synthetic rubber, it should be allowed that opportunity *now*. Unless all possible plans for additional synthetic production are made at once, January, 1951, may find us again confronted with the specter of "too little and too late."

DEPARTMENT OF PLASTICS TECHNOLOGY

Extrusion Needs[1]

M. S. Greenhalgh[2]

EVERY development chemist, process, methods, or manufacturing engineer who is connected with the extrusion in any form of either plastic or rubber compounds is cognizant of the need of proper and efficient extrusion equipment. One of the reasons why both rubber and plastics have been referred to above is because there is no doubt that these materials are becoming more and more closely related. In addition a goodly portion of the knowledge of extrusion equipment has been based on experience with rubber compounds.

Since the advent of vinyl compounds, the extruding business has grown by leaps and bounds. We have progressed from the old rubber extruder to the extended, double-extended, and multi-barreled versions—from the old food chopper screw to the torpedo, constant pitch, and diminishing types prevalent today.

At the same time improvements have been made on the plastic compounds themselves. Today we have faster and easier processing resins. It is necessary that we take full advantage of these resins for economical reasons. The technique of feeding the extruder in many cases has changed from mill-fed to granulated and, finally, to powder mix. Pigments, lubricants, fillers and plasticizers, together with the base resin or compound, are being added directly in the extruder. In short, the extruder is being required to perform tasks which hitherto have been performed in various types of mixing equipment.

Many questions, however, are still unanswered as to what is the proper and most efficient extruder design. It is felt by many that the equipment manufacturer has not kept abreast of the needs of industry. Perhaps it is also the fault of industry itself for not properly presenting the problem on a cooperative basis to the equipment manufacturer.

This need not only covers the fundamental design of the extruder itself, but also a design which would be more efficient from a manufacturing standpoint of simplification of operation by the factory operator. It is not the intent of the author, at this time, either to state his opinions or attempt in any way to solve the various problems presented in this paper. Rather, the purpose is to present these problems so that they might be brought to the attention of the manufacturer. It might be that he is already aware of these troubles, but does not realize the extent to which they plague the processor.

Screw Design

In starting with the fundamental design, there is no doubt in anyone's mind that the heart of the extruder is the screw. Yet today there is hardly any agreement throughout the industry as to what is the best type. By type is meant single- or double-pitch; shallow or deep cut; constant or diminishing depth; angle of pitch; width of pitch; blunt, knobbed, or torpedoed; and last, but not least, the overall length. How many times upon ordering an extruder has one been informed by the manufacturer that the machine includes a "standard screw"? Just what is a standard screw?

Not so long ago the author personally inquired of a representative of one of the larger and more prominent extruder manufacturers why a certain type of screw was delivered as standard equipment. The author was informed that confidentially the representative did not know. It had been his experience that this particular type of screw, to his knowledge, had never satisfactorily been proved, and in many cases he hesitated even to recommend it. It is felt by many that more of an engineering study has been made on the study of an agitator of a domestic washing machine than on the screw of an extruder.

Screw Clearance

The screw, important as it is, is not the whole answer. One important point has been almost totally unnoticed despite the fact that it has been recognized any number of times as being the reason why a certain type of screw gave a good performance in one machine and not in another, although the extruders were supposed to be identical to each other in every respect. This is the clearance between the screw and the barrel or sleeve. One can go into a great deal of theorizing on what the exact clearance should be and why. It is sufficient to say that there seems to be an optimum clearance which should be both practical and efficient from the standpoint of maintenance and operation.

In discussing the clearance and taking into account any slippage or scrubbing action which might be desirable, the finish of the screw and the sleeve must be considered both from the standpoint of aiding in the frictional action and preventing decomposition of the plastic compound. Should either the screw or sleeve be plated or made from a special alloy?

Feed Holes

Some time ago a test run was made at the author's plant in Bridgeport whereby two extruders with different types of feed holes were evaluated on a test run. One of these machines had a center feed which consisted of a circular hole directly over the screw; while the other machine had a rectangular side feed. The results obtained on this particular run were quite surprising. Yet we have the same standardization of feed holes by the manufacturer as we have in the case of screws.

Screens

One basic difference between plastic and rubber extrusion is the use of screens in a plastic setup. The answers as to how many holes and the size of holes a breaker plate should contain and whether or not they should be tapered have never satisfactorily been answered. Furthermore the space between the end of the screw and the breaker plate is quite important, and this variable has never definitely been established.

In considering the breaker plate, one has to take into account the screens. Nothing in the extruder is varied quite so much as the screens. Naturally, this is so because of the ease and economy with which these screen changes can be made. There is much confusion as to what mesh screens, the number of screens, and how they should be placed. One thing is certain: if the screw is not performing correctly by not delivering the required amount of plasticized compound, varying the screens will not mean a thing.

Extruder Heads

Traveling down the extruder from the feed hole, the next item is the head. The straight-away extruder does not have the problem that the cross-head extruder has. In common the size and the internal contour of the head are most important. This point is particularly true for the cross-head where the direction of flow of the compound is changed to the extent of 90 degrees. It is quite interesting to note the manner in which the Germans attempted to solve this problem during the last war by designing straight-away heads together with nippled screws and also 45-degree cross-heads. Both of these ideas were used for insulating wire with thermoplastic materials.

In most cases where cross-head extrusion is being done, a centering device is employed. Numerous problems concern its use, but most of these are purely mechanical, and the complaining usually comes from the operator of the extruder. This problem, therefore, will be discussed under manufacturing design.

Heating and Cooling

The final items under the fundamental design are the heating and cooling facilities which might be available. Most extruders are heated by either oil or steam. Of late, a number of electrically heated extruders have appeared on the market. This method of heating is by far the easiest and cleanest. All electrically heated extruders, however, should be provided with proper methods of cooling owing to the fact that these extruders have a tendency to overheat or override, particularly with vinyl compounds.

This last point is very important, because it has been shown beyond any doubt that internal working of the compound in the extruder was causing heat build-up which hitherto had been overlooked because the steam or oil was not only heating the extruder, but also preventing overheating. This point was further proved by the fact that some of the original designs for electrically heated extruders did not provide any cooling facilities. Decomposition of the compound was usually the result. It is quite evident, from the above information, that not too much is known of the heat history of a compound as it flows through the extruders. Perhaps finer and more accurate control of both heating and cooling is needed.

[1] Presented before sixth annual National Technical Conference, Society of Plastics Engineers, Inc., Cleveland, O., Jan. 13, 1950.
[2] General Electric Co., Bridgeport, Conn.

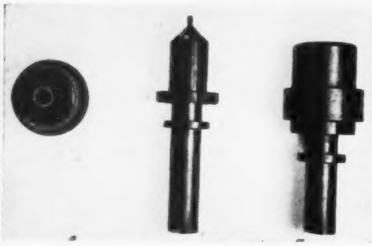


Fig. 1. Self-Centering Set-Up for Cross-Head Extrusion of Nylon Wire Coating: *(L. to R.)* Die, Nipple, and Assembled Die and Nipple Positioned for Placement in the Extruder Head

Design *vs.* Factory Operation

As previously stated, it is felt by many that the design of the extruder from the standpoint of actual factory operation could be improved. Most of the complaints on this score come from either the operator or the foreman. One has only to go back a few years to remember the cumbersome head changes. Today most heads are on hinges, but improvements still could be made. In a number of cases the extruder has bolts and nuts which are hard to get at, heads which are hard to clean, breaker plates which jam, hoppers which do not stand up under constant use, etc.

In the case of centering devices for cross-head extrusion, there is room for much improvement. The standard four-bolt method is not satisfactory by any means. Broken bolts which have to be drilled out, barked knuckles, and chewed die holders are certainly good evidence to substantiate this point. Some attempts have been made to overcome this by different designs. They have not been fully proven out. The principle of both the self-centering nylon set-ups (see Figure 1), and the Western Electric self-centering heads is certainly an improvement.

It is the hope of many processors to have a design particularly for cross-head extrusion whereby the operator will not have to keep ducking underneath that which is being extruded in order to operate the machine. It is preferred that the operator remain on the head side of the extruder and by the proper placement of a panel board containing instruments, controls, etc., operate the tuber from that position, eliminating the need of the ducking referred to above. (See Figure 2.)

There is one objection which is not a true function of the design on an extruder, and that is non-standardization in designating the various sizes of extruders. Such a standardization by the various manufacturers would certainly aid industry.

One might think, after taking into account all of the problems previously discussed, that it is just short of a miracle that any extrusion is being done at all. It is the feeling of the author, however, that if one is close enough to the extrusion process, one will have no trouble substantiating these problems and most likely could elaborate on them to some length. Further proof of this point is the number of heated discussions in which the author has taken part over the last decade.

Recent Developments

In attempting to overcome some of the aforesaid difficulties, there have been designed entirely new types of extruders, for example, the Millstruder (National Rubber Machinery Co.) and the double-parallel screw extruder (Welding Engineers, Inc.). These machines were designed to overcome a number of the present extrusion troubles. In addition, the machines are better able to process new plastic compounds and permit variations in the mixing techniques of existing compounds.

Summary and Conclusions

In summarizing, the most important need of the plastic extrusion industry is a more efficient design of screw which would take into consideration the importance of clearances. When this has been done, then the major problem will have been solved. The solution of the other problems, such as heating and cooling, design of head, etc., can then be undertaken on the basis of the above results.

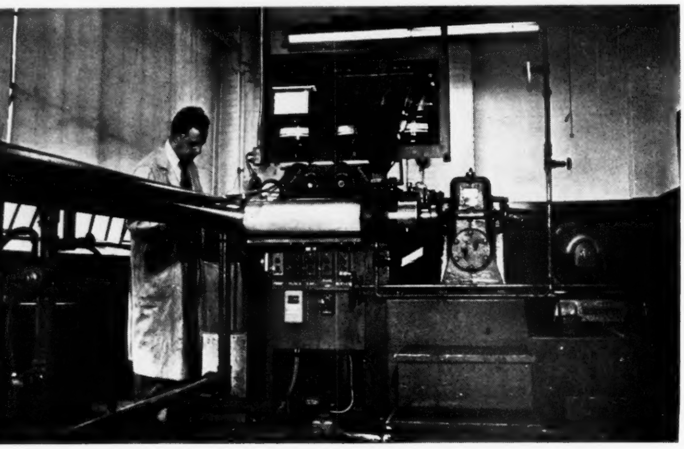


Fig. 2. Conventional Electrically Heated Cross-Head Extruder, Showing Inconvenient Placement of Controls and Temperature Recorders

MIT Conference on Properties of Plastics

A THREE-DAY summer conference on the "Mechanical Properties of Plastics" was held at the Massachusetts Institute of Technology, Cambridge, on June 20-22. Sponsored by the MIT Plastics Committee, the conference consisted of the presentation of 23 papers on research and engineering problems involved in determining the mechanical properties of plastics and in using those properties in engineering and architecture. Available abstracts of the papers are given below.

Prof. Albert G. H. Dietz, Department of Building Engineering and Construction, is chairman of the Committee, which includes the following professors: E. A. Hauser, Department of Chemical Engineering; W. H. Stockmayer, Department of Chemistry; W. M. Murray, Department of Mechanical Engineering; and E. R. Schwarz, Department of Mechanical Engineering (Textile Technology). The complete papers will be published in a symposium volume by the MIT Technology Press late this year.

Program for Tuesday, June 20

The Theory of Visco-Elastic Behavior of High Polymers. Turner Alfrey, Polytechnic Institute of Brooklyn, Brooklyn, N. Y.

Static and Dynamic Properties of Rubber-Like Materials. E. Guth, University of Notre Dame, South Bend, Ind.

Reaction of Polymers and Mechanical Waves. W. O. Baker, Bell Telephone Laboratories, Murray Hill, N. J.

The "equilibrium" mechanics of polymers have been developed in the range of high strains. However, the molecular displacements, as these and much smaller strains occur, are little understood. An approach to determining these mechanisms is to strain polymers with periodic waves over a very wide spectrum of wave lengths, eventually going to frequencies comparable with those of the thermal vibrations of significant groups or segments in the macromolecules. The resulting dispersion or resonance phenomena can then be examined. Hence a mechanical radiation field can interact with the masses of elementary structural units as the usual electromagnetic field interacts with atomic and group charges. In general, direct interpretations of this kind must be done with sheer waves and not only with longitudinal or ultrasonic waves. Results of studies using this approach are discussed.

Mechanical Properties of Plastics at Ultrasonic Frequencies. W. P. Mason, Bell Laboratories.

One of the most promising methods for investigating the types of motions that polymers can undergo is to determine their reaction to mechanical waves. The most information can be obtained when long polymer chains are dissolved in a solvent, for then the interchain and intrachain reactions can be separated as the dilution of the solution is increased. The added stiffness caused by the dissolved polymers is more readily detected and measured when shear rather than longitudinal waves are used. With liquids, the torsional crystal and the reflection of shear waves at a solid-liquid interface are used to evaluate the shear viscosity and shear elasticity of the liquid. When these methods are applied to dilute solutions of polyisobutylene, they indicate three relaxation ranges tentatively identified as the configurational relaxation range, an interchain reaction, and a relaxation associated with the freezing of the chain joints.

When these shear methods are applied to pure polymers of small molecular weight, the presence of a quasi-configurational shear elasticity is shown which is relaxed by the shear viscosity of the liquid for frequencies under 100 kilocycles. A second relaxation occurs in the megacycle range, and for higher frequencies the liquid acts

as a crystalline sold. When polymers occur in the form of solids, two new methods have been devised for measuring the longitudinal and shear wave velocities and attenuations. One method, of the optical type, utilizes a Debye-Sear cell; while the other method is a modification of an ultrasonic pulsing system for solid samples. These methods check satisfactorily and have been used to determine the mechanical properties of nylon and polyethylene.

The Usefulness of Basic Mechanical Properties in the Evaluation of Plastic Materials. R. Buchdahl and L. E. Nielsen, Monsanto Chemical Co., Springfield, Mass.

The objectives in a study of the mechanical properties of plastics are: (1) to obtain information which defines the "applicability" of the material; and (2) to obtain information which will relate the mechanical properties to the molecular structure and composition of the material. It is shown that many of the common or standard test methods are ill suited to achieve either objective, and the need and advantages of less conventional, but more basic physical measurements are demonstrated.

Methods to measure certain basic mechanical quantities, including dynamic elastic modulus and damping, and viscous and visco-elastic compliance, are briefly described. By using specific examples, it is shown how such data can be employed to achieve the above two objectives.

Mechanical Properties of Linear Amorphous Polymers. R. D. Andrews, Princeton University, Princeton, N. J.

Linear amorphous polymers, such as polyisobutylene, polystyrene, and polymethyl methacrylate, show a continuous transition from liquids to relatively rigid materials as molecular weight increases. In addition these materials characteristically exist in a glassy state below a certain "transition" temperature range and in a rubbery elastoviscous state above that range.

The elastoviscous properties of polyisobutylene above its transition range have been investigated in some detail by measurements of stress relaxation. This material exhibits a broad distribution of relaxation times, and the effects of temperature and molecular weight on this distribution have been investigated, and certain simple regularities observed. Results obtained in the direction of relating flow viscosity, creep, and vibration data with stress relaxation data for this material will also be discussed.

Papers Scheduled for Wednesday, June 21

Flow Markings in Polymeric Solids. Waller George and George Irwin, Naval Research Laboratory, Washington, D. C.

The development of localized plastic flowing in sheet specimens of polymeric solids is described in terms of characteristic flow figures or markings. These markings appear after the elapse of a time interval or "delay time" following the application of loads to the specimen. The markings grow in time into geometrical configurations which become unstable and collapse into local necking, plastic shock waves, and other gross localizations of flowing.

A parallel is drawn between the collapse of these markings and the collapse of "creepy" cracks when they have reached their critical size. The subsequent initiation of plastic shock waves which traverse the specimen is described in terms of the Taylor-Karman plastic wave theory. Possible similarities between flow figures and craze markings will be discussed. Films will be shown illustrating the flowing processes in polyamide films.

Injection Molding of Polystyrene. R. S. Spencer, Dow Chemical Co., Midland, Mich.

The sequence of events during an injection molding cycle of operation is broken down into the following steps: (1) "dead" time during which the plunger moves forward without flow of polymer from the nozzle; (2) filling the mold; (3) "packing" the mold; (4) discharge from the mold; (5) sealing the mold; (6) sealed cooling; (7) opening the mold; (8) the time during which the mold stands open; and (9) closing the mold for the next cycle. Once this breakdown has been made, many of the phenomena encountered during molding become subject to qualitative and/or quantitative theoretical treatment.

The formation of many types of defects in molded articles may be associated with certain of these steps in the molding process, including surface blemishes, sink marks, internal bubbles, and frozen-in strains. In many cases careful consideration of the origin of these defects leads to suggestions for corrective action. Brief mention is also made of the manner in which these concepts may be unified, together with consideration of cycle times, into a graphical picture of the molding process. This picture permits definition of such ideas as optimum molding conditions and comparative moldabilities of polymers.

Complex Stressing of Polymers. I. L. Hopkins, Bell Laboratories.

Biaxial stressing of polyethylene has been shown to cause brittle fractures in material which exhibited cold drawing under uniaxial stress. This paper presents further data on polyethylenes, including the change in biaxial tensile properties with molecular weight over a homologous series; an analysis of conditions at the yield line as it progresses from the center to the edge of the test diaphragm; and a discussion of the behavior of polyethylene in terms of stress theories.

The forms of the biaxial stress-strain curves for other materials are shown, including polytetrafluoroethylene which exhibits inter-granular failure, and polyethylene terephthalate which was oriented before the test. Frozen *Hevea* rubber and other materials will also be discussed.

Fracture Appearance in Plastics. J. A. Kies, Naval Research Laboratory.

Fractures in plastics were compared with those in other materials, including metals and minerals. Photomicrographs were prepared to illustrate those morphological features resulting from the operation of flaws and other fracture elements which travel at different local speeds and then combine along level difference lines. Any fracture can be descriptively defined as an activation of flaws and the coalescence of holes spreading from them. Separation is otherwise only by flow. In ductile materials the holes tend to be spherical or ellipsoidal; while brittle materials show holes more disk-like in the early stages.

It is suggested that fracture studies may find some use in quality control of plastics as they already have in metals. The macro- and micro-structure of the fracture, particularly the latter, are strongly influenced by the total available elastic energy and its rate of possible expenditure in relation to the work required to propagate the fracture. Formulae given can be used to predict fast or slow fracture in plates.

Flow and Fracture Characteristics of Polymethyl Methacrylate. W. J. Gailus, MIT.

The first section of this paper deals with the further development of an established theory to explain the mechanical behavior of linear amorphous polymers in terms of a physical characterization of the molecular structure. The theory makes the assumption that the force of retraction (or the stress in simple tension) originates entirely from the entropy change on stretching, and the change in internal energy with elongation is assumed to be negligible. Deformation is assumed to proceed at a constant volume. This theory incorporates the effect of time as a variable and permits specifying the visco-elastic nature of linear polymers.

The second section deals with the experimental verification of the expression obtained and, in addition, with experimental work on the physical behavior of linear polymers as represented by methyl methacrylate.

Creep and Relaxation Properties of Polymethyl Methacrylate. Steven Yurenka, MIT.

Recent advances in the science of high polymers have resulted in the development of theories which permit interpretation of the properties of plastics in terms of molecular quantities. These theories make possible evaluation of some of the molecular constants required to correlate satisfactorily the physical and chemical behavior of a plastic with the properties of the molecules of which it is composed. The present paper demonstrates the application of relaxation and creep data of polymethyl methacrylate to the Tobolsky-Ering theory of mechanical properties of high polymers for the purpose of determining certain molecular constants characteristic of this polymer. The creep and relaxation data, together with tests at constant rates of strain, may be conveniently plotted on three dimensional stress-strain-time diagrams, thus developing a surface which gives an indication of the behavior of polymethyl methacrylate under any combination of stress, strain, or time.

The Effect of Molecular Weight Distribution on the Stress-Strain Properties of Polymethyl Methacrylate. E. A. Hauser and E. E. Patterson, MIT.

Most basic research in the high polymeric field is handicapped by the small quantities of material available for physical testing. A primary object of this investigation was the development of physical testing equipment and techniques suitable for small quantities of material. A second object was the utilization of these methods in an investigation of the effect of molecular weight distribution on the physical properties of polymethyl methacrylate. The physical properties investigated were those obtained from the tensile type of stress-strain test.

Films were formed from a wide variation of molecular weights of both the fractionated and unfractionated material. An investigation of the variation of tensile properties as a function of molecular weight and, molecular weight distribution was carried out. No variation of the stress-strain behavior was observed with molecular weight distribution except for the break point. Attempts to correlate the ultimate stress and strain with molecular weight are successful when number average values of molecular weights are used. No significant variation of the physical properties was observed at a higher number average molecular weight than 60,000.

The effect of molecular orientation on **cules on the Mechanical Properties of Polvstyrene.** R. G. Cheatham, MIT.

The effect of molecular orientation on the mechanical and physical properties of high polymeric materials has long proved

an interesting consideration. The pronounced improvement of certain properties in rubber imposed by orientation processes can be attributed to crystallization. The improvement of certain properties of amorphous materials due to orientation processes, however, cannot be so easily explained.

Low-angle X-ray diffraction studies on polystyrene show that crystallization does not occur, but rather a fibrous lamellar structure is created. The fact that some orientation is imposed is brought out in birefringence studies, and the increase in tensile strength, etc., can partially be attributed to this. It has been determined, however, that the increase in various properties passes through a maximum, and that after a certin degree of stretching a decrease in maximum stress is observed. It seems, therefore, that the stretching not only aligns the random chain of molecular structure, but also decreases the localizing effect of surface flaws.

Papers Read Thursday, June 22

Mechanical Properties of Rigid Plastics. Robert Burns, Bell Laboratories.

This paper discusses the principal categories of rigid plastics in terms of their usefulness in parts where mechanical integrity is essential to satisfactory performance. Since conventional engineering data covering molding compounds have received wide publication, the author attempts to emphasize only those properties of each class of plastics which are unique and which will exert a strong influence on the plastic part's behavior in service. Such properties as deformation under load (cold flow), stress release, maximum service temperature, and related rheologic phenomena are included as "mechanical properties" on the basis that they have a profound effect on form stability, which is of the essence in precision structural applications. Crazing and cracking, though not mechanical in the strict sense of the word, are included for the same reason.

Evaluating Mechanical Properties of Polyethylene and Other Non-Rigid Plastics. R. H. Carey, Bakelite Division, Union Carbide & Carbon Corp., New York, N. Y.

The fundamental and practical mechanical properties of various molecular-weight polyethylene resins have been studied by means of torsional torque-deflection curves and tension stress-strain curves over a wide temperature range. The stiffness properties have been evaluated with good accuracy from —125 to 25° C. In addition, an arbitrary "elastic limit" has been defined in order that the stress and strain at this limit may also be used to describe the variation of mechanical properties with molecular weight.

The properties of polyethylene are compared with metals, non-rigid plastics, and rubber. It is shown that polyethylene is not a rubber-like or elastomeric material, but more nearly resembles some non-ferrous metals. This comparison is inferred from its crystalline nature, stress-strain diagram, and the stress corrosion cracking phenomenon. The effect of molecular weight on stress corrosion cracking is illustrated by tensile tests conducted in corrosive media.

Plastics-Base Laminates. G. H. Clark, Formica Co., Cincinnati, O.

This paper will discuss the different problems, encountered in making laminates by comparison with articles made by the molding process. The paper also will outline the properties of some of the newer laminates being offered in the fields using melamine and silicone resins. The program adopted by the laminated plastics industry during the war and continued up to the present by way of the Johns Hopkins test project will be described, together with its effect on the industry's products. Also included will be a description of the current situation in the decorative laminates used architecturally and for utility purposes, with stress on the need of developing new materials.

Engineering Adhesives. F. M. Reinhart, National Bureau of Standards, Washington.

Protective and Decorative Industrial Finishes. M. R. Euverard, Interchemical Corp., Bound Brook, N. J.

This paper, general in nature, reviews the entire problem that must be considered by the formulator in developing an industrial finish or a coating for architectural purposes for any given end-usage. The paper outlines the reasons for using protective or decorative coatings and discusses the many variables that must be considered in formulating a coating. Performance characteristics of coatings are also considered. The last portion of the paper describes recently developed test methods which afford a high degree of accuracy in determining certain attributes of coatings and coating materials as well as related products. Included are methods for determining both wet and dry film thickness, elastic properties, viscosity, and surface tension.

Synthetic Textiles in Automobiles. N. J. Rakas, National Automotive Fibers, Inc., Trenton, N. J.

Developments in Coated Fabrics and Films by the Quartermaster Corps. Ladislav Boor, Philadelphia Quartermaster Depot, Philadelphia, Pa.

The behavior of the synthetic resin coatings used in rainwear during the war is discussed. One source of deterioration was identified as microbiological attack on oil-type plasticizers, resulting in stiffening and tendering of the coated fabrics. Experimental work on fungicidal and bactericidal additives to prevent this form of deterioration is described. The pattern of deterioration of a coated fabric by the four other common degrading factors (light, heat, moisture, and air) was studied. Test procedures for measuring the most significant properties are described, and the simulation of the effects of outdoor weathering is dealt with.

The principal variables in the synthesis of a coated fabric are considered, and the effect of each variable on major physical properties are tabulated. The most important variable was found to be the modulus of the coating, and its effect on tear properties is illustrated. The importance of behavior of plastic film under biaxal stress is discussed, and typical test data made under uniaxial and biaxial tension are shown.

Resistance of Plastics to Various Service Conditions. G. M. Kline, National Bureau of Standards.

Twenty-Five Examples of Reinforced Plastics Produced at Low Pressure, with Matching Engineering Data on Each. L. S. Meyer, Western Products, Inc., Newark, O.

Letter to the Editor

July 20, 1950.

EDITOR,
India RUBBER WORLD,
New York, N. Y.
DEAR SIR:

READING the article, "Controversial Points on Extrusion," in the June issue, I throught that it might be of value to point out several points where Mr. Buechen's experience, or his interpretation differ from my own. I wish to specify that the ideas presented represent my own opinion and are not necessarily shared by other members of the firm I represent.

I will present my comments in the same order as the subject matter appears in the article.

The defense of the double flight or the single into double flight screw is understandable because such screws have long been standard equipment, particularly in the wire industry, and one is naturally reluctant to abandon a design that has such a long and valuable history. The fact remains, however, that competitive conditions are forcing greater demands upon extruder capacity, and that when worm speeds and production demands are increased such screws show definite deficiencies.

The following applies particularly to the single into double design. Despite Mr. Buechen's statement that variation in the output of the two flights can only occur when the screw is incompletely filled or not uniformly machined, such variations with resulting pulsations frequently appear when the machine is pushed for capacity. These pulsations may be due to incomplete filling of the grooves near the feed end, but even with a full worm the way in which plastic materials travel through the machine may cause differences in flow through the two grooves. Contrary to the way rubber or paste-type compounds progress, dry extruded plastics do not roll through the grooves as a mass, but slide along with only local turbulence, often for the greatest part of the extruder length. The result is that the part of the material immediately in front of the advancing land contains the stock that has had the most contact with the cylinder wall. The land scrapes the stock sticking to the cylinder off and accumulates it against the land. This means that often well past the middle of the machine the part of the stock against the advancing land is hotter and softer than that in the rest of the groove. If the groove is split at this point the hot stock goes into one groove, and the cooler into the other. This situation is aggravated by the characteristic of plastic flow that a small difference in the resistance of two alternative paths makes a much greater difference in the amount flowing through the two paths than would be expected from experience with ordinary fluid flow. In general, when production or performance troubles appear in an operation using a double flight screw, they can be alleviated by removing all, or most, of one land, or by replacing with a single-flight screw.

Under screw materials, in spite of common opinion, I tend to doubt the value of plating the screw. A properly resistant alloy well-finished will give as good performance, without the hazard of loosening of the chrome plate and contamination of the stock.

In the discussion of craze or hairline cracks of Xalloy liners, it is never wrong to recommend replacement of a liner that shows damage. We have, however, had customers that reported such cracks years

ago and have operated the machines for a long time with the liner cracks, without any evidence of trouble.

It is evident that the extended emphasis on cylinder cooling under cylinder temperatures, followed by an emphasis on the advantages of conducted *versus* frictional heat in the next section, shows a basic confusion about where the heat in an extruder really comes from. Heat balance studies show that this heat comes from friction, in overwhelming proportions. To demonstrate what I mean without undue length, take the 2½-inch extruder whose capacity was calculated in Figure 4 of the Buechen article. This machine produced 90 pounds per hour and would presumably be driven by a 10 h.p. motor. Assuming a 90% efficiency for drive and motor, the power converted to heat in the extruder per hour is equivalent to

10 x 0.9 x 2546   23,000 B. T. U. of frictional heat.

The heat required for 90 pounds of an average plastic to raise it from room temperature of 80° F. to an extrusion temperature of 380° F., assuming a very liberal heat capacity of 0.5 B. T. U. per pound, per ° F., would be

90 x 300 x 0.5   13,500 B. T. U.

In other words, the frictional heat is more than enough to do all the heating required with about 10,000 B. T. U.'s left over. This case is probably an exaggerated one, but, in general, the net heat input to the stock by conduction is very little; the plastic is heated by friction regardless of make or design of extruder. The function of the temperature control system of an extruder is redistribution of heat, not net addition.

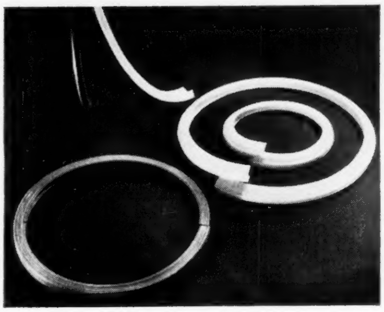
I do not want these comments to be taken as depreciation of the value of the article, but merely as an indication that controversial points are indeed controversial.

Yours truly,
THEODORE KRESSER,
New England Representative,
National Erie Corp.

Rulan, Flame-Retarding Plastic

RULAN, a new flame-retarding plastic for use in high-quality insulation, is being offered to the wire and cable and electrical industries by E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. Now available in commercial quantities, the plastic was developed in the laboratories of the company's polychemicals department. Whereas flammability has been a characteristic disadvantage of plastics possessing good electrical properties, tests with Rulan have shown that it will not burn after the flame has been removed. Neither will it drip when molten, a further advantage since hot plastic drippings are liable to start other fires.

The electrical properties of Rulan are comparable, although not equivalent, to those of polyethylene. Its power factor over a wide range of frequencies is 0.002, the same as polyethylene, but its dielectric constant is 2.7, as compared with less than 2.5 for polyethylene. The new insulation is non-tracking, retains its electrical properties after immersion in water for long periods at elevated temperatures, has excellent low temperature properties, and good mechanical properties, it is said. Rulan can be extruded on to wire at high speeds and can also be injection molded. Molded electrical parts and extruded tape are being developed for uses where flammability may be involved.



Curved Polyethylene Extrusions Produced by New Process

Extrusion of Curved Shapes

A TECHNIQUE for producing curved shapes by extrusion has been developed by Anchor Plastics Co., New York, N. Y. Patent applications on the process have been filed, and the company has been granted United States patent No. 2,503,813 on a particular application of this process. This application consists of a ring and sleeve assembly for mounting and electrically insulating metal television picture tubes and is already being widely used. While this particular product is made of Aeroflex polyethylene because of its low loss factor, the technique of curved extrusions is applicable to any of the thermoplastics being extruded commercially.

SPE Sections Close Season

THE Miami Valley Section, SPE, concluded its 1949-1950 season with its third annual picnic and outing June 16 at Terrace Park Country Club, Milford, O. The afternoon program included a golf tournament, with 25 members participating, and softball and horseshoe pitching contests. The outing concluded with a dinner attended by 42 members and guests, followed by a showing of a sports film.

Prize winners in the golf tournament were blind bogey, Martin Kasch, Kurz-Kasch, Inc., and vice president of the Section; low gross and low net, James Beachler; and high gross and high net, Richard Bice, Formica Insulation Co. In the horseshoe pitching contest, prizes were won by S. D. Marcey, National Cash Register Co., and Arthur Fischer, Kurz-Kasch. Door prizes went to Nick Backscheider, Recto Molded Products, Co., G. Pfau, Plastic Molding Corp., and Charles Selz, Kurz-Kasch. Arrangements for the outing were made by a committee headed by Merle Nelson and Jack Baxter.

The Section will begin the new season with a picnic and outing to be held early in September at Old River Park, Dayton.

Fire Problems with Plastics Manufacturing

The final meeting of the season of the Cleveland-Akron Section took place on June 23 at Bowen's Restaurant, Cleveland, O. Approximately 45 members and guests heard Matthew M. Braidech, National Board of Fire Underwriters, discuss "Fire Problems in Plastics Production."

The speaker emphasized the need of proper plant construction, storage of raw and finished materials, and plant housekeeping in preventing fires and the need of special safeguards to keep fires under control should they occur. Mr. Braidech also pointed out that close cooperation should exist between plant and local fire departments with regard to assistance in times of emergency. The speaker stated that many lives have been lost unnecessarily because of improper fire fighting methods in chemical plants owing to lack of knowledge of conditions in the plant by the local fire department.

New Vinyl Adhesive

VINYL-HESIVE, a new adhesive for bonding all flexible vinyl formulations to paper, pressboard, cardboard, masonite, felt, and other porous surfaces, has been developed by Thomas W. Dunn Co., New York, N. Y. The new adhesive is a water thinnable emulsion-type product that can be applied by brushing or with conventional equipment. Its non-staining properties are such as to reduce to an absolute minimum the number of rejects resulting from discoloration of the vinyl by the adhesive. The dried bond is extremely resistant to aliphatic hydrocarbons, oils, greases, water, and deterioration caused by bacteria and fungi. Since the adhesive is relatively non-toxic, it is useful for food packaging.

Reet Vinyl Film

THE trade name Reet has been adopted for the unsupported vinyl film and sheeting made by Ross & Roberts, Inc., New York. At the same time Vice President A. V. Roberts announced that the company's new plant at Stratford, Conn., is now on a full production schedule for Reet film and sheeting, and full operations are also continuing at the firm's West Haven, Conn., plant. A new line of embossed vinyl was scheduled for production by mid-July. The first pattern planned is a taffeta and will be followed by moire, herringbone, and other patterns.

PMMA and MCA Merge

IN REGULAR meetings late in June the Manufacturing Chemists' Association, Inc., and the Plastic Materials Manufacturers Association, Inc., voted unanimously to consolidate. A new association, under the name of the Manufacturing Chemists' Association, Inc., has now been organized under the laws of New York State; all members of the former associations become members of the new corporation.

All the officers of MCA were reelected for the year 1950-51. The joined associations will continue to coordinate activities of plastic materials manufacturers, as performed by PMMA in the past. In overall industry problems, the plastics manufacturers will operate as a group within MCA; the former PMMA directors will act as a steering committee for such plastic activities.

The Washington, D. C., offices of the associations will be merged in the near future. M. F. Crass, Jr., Association secretary, will be in charge of this office, and F. H. Carman will continue to direct the plastics programs. General trade association matters common to all chemical manufacturing will now be combined for the entire membership.

Scientific and Technical Activities

ASTM Committee D-11 Holds Annual Meeting at Atlantic City

As a part of the annual meeting of the parent society, Committee D-11 on Rubber and Rubber-Like Materials of the American Society for Testing Materials held meetings of its several subcommittees and of the full Committee in Atlantic City, N. J., on June 28, 29, and 30. Chairman Simon Collier, Johns-Manville Corp., presided at the meeting of the Committee and at the meeting of the advisory committee and subcommittee chairmen on the evening of June 29, assisted by A. W. Carpenter, B. F. Goodrich Co., secretary of D-11.

D-11 and Advisory Committee Meetings

At the meeting of Committee D-11 on June 30 and as a result of the meeting of the advisory committee and subcommittee chairmen's meeting of the evening before the following actions were taken:

The chairman of the nominating committee, L. V. Cooper, Firestone Tire & Rubber Co., reported a slate of officers and advisory committee members for the period until the next biennial election. With no further nominations from the floor the candidates were unanimously elected as follows: chairman, Mr. Collier; vice chairman, H. Bimmerman, E. I. du Pont de Nemours & Co., Inc.; secretary, Mr. Carpenter; other advisory committee members, H. E. Outcault, St. Joseph Lead Co., R. A. Schatzel, Rome Cable Corp., Mr. Cooper, and R. F. Tener, National Bureau of Standards.

In connection with the interests of members of Committees D-20 on Plastics, D-9 on Electric Insulation, and D-11 on Rubber in vinyl plastic materials, the question as to where the line of jurisdiction of these three committees on the vinyl plastic should be had arisen among the officers of the Society. The Society was informed that no line of jurisdiction is necessary as long as the present cross-representation remains effective, and approval for this method of handling the problem has been received from headquarters of the Society.

The formation of an ASTM committee to prepare specifications for various types of floor covering comprising asphalt and rubber tile, and plastics and cork compositions, is being considered by the Society. D-11 voted approval of the formation of such a committee and will be represented on it and, in addition, takes the position that all matters having to do with rubber floor covering materials should be referred to D-11.

Committee D-14 on Adhesives has requested jurisdiction over specifications for resin bonded brake linings, at present handled by subcommittee 21 of D-11, but it was voted that the headquarters of the Society should be informed that D-11 saw no reason for making such a change.

The meeting of the International Standards Organization, ISO Technical Committee 45-Rubber, previously scheduled for Monday and Tuesday, October 9 and 10, in Cleveland, O., with Committee D-11 as the host, has been changed at the request of the international organization to Akron, O., for the week beginning October 16. This meeting will have a five-day program with Monday, October 16, devoted to the subjects of hardness, stress-strain, and tensile strength; October 17, aging, abrasion, and ply adhesion; October 18, the grading of natural rubber; October 19, flex cracking and latex specifications; and October 20, bonding of rubber to metal, dynamic testing, classification of rubber by physical tests, and consideration of the long-term program of Technical Committee 45.

Committee D-11 will not have a fall meeting, but its subcommittee chairmen on sections devoted to subjects on the agenda of the ISO meeting have been asked to attend the Akron meeting and to be prepared to answer any questions on American methods of test or specifications on their particular subjects that may be asked by the foreign visitors. The meeting will be held in the Mayflower.

Mr. Cooper has been appointed general chairman on arrangements for the entertainment of the visiting technicians.

No immediate plans for the symposium on the significance of test results considered at the March, 1950, meeting of D-11 were made, but it will be the duty of each subcommittee chairman to prepare information on the significance of the tests under his jurisdiction for possible future use.

Subcommittee Meetings

Subcommittee 2—Belting. M. G. Schoch, Jr., Hewitt-Robins, Inc., chairman. Proposed revisions in the tentative methods of testing flat rubber belting to replace D-378-41 were discussed and were recommended for letter ballot on this adoption. Consideration of the machine method of adhesion testing was not completed, and it was decided that the present revisions would not be held up.

Subcommittee 3—Rubber Thread. J. J. Allen, Firestone, chairman. The results of the round-robin test program among eight cooperating laboratories to determine the reproducibility of specific gravity and modulus values were examined further, and poor agreement between laboratories, particularly with the tests on the fine sizes, was noted. Difficulty in obtaining complete removal of soapstone is considered the main cause for the poor agreement between specific gravity values. Another round-robin program using the pycnometer and solution methods is to be run.

Poor agreement between laboratories was also evident in the modulus values determined by the inclined plane tester and Method B of the new proposed method of tests for thread rubber. Test results with the inclined plane tester were lower than with the second method, and another round-robin program of testing for this value is also to be made. In addition, modulus results using Method A, which employs constant load, will be obtained.

Subcommittee 4—Rubber Protective Equipment. Gordon Thompson, Electric Testing Laboratories, Inc., chairman. The four ASTM and ASA specifications for rubber insulating line hose, insulator hoods, insulating blankets and sleeves adopted in 1949 are now in use. A 16-page pamphlet containing these specifications is available from the ASTM headquarters.

As soon as the revision of the specification for electrical workers' rubber gloves, D-120-40, is completed, a round-robin test program will be run. Thickness limits for the three grades of such gloves for the proof-voltage test will be included in the new revision. A fourth grade, i.e., for low distribution voltage use, is being urged for inclusion in the specification, but no action is contemplated until sentiment has crystallized further on this grade.

Subcommittee 5—Insulating Wire and Cable. J. T. Blake, Simplex Wire & Cable Co., chairman. Minor changes in specifications were voted. The method for the determination of dielectric resistance temperature coefficient is being withdrawn from specifications recommended for adoption so that further study on this method may be made. Also, the specifications for polyethylene power cable and Butyl rubber insulation are to be studied further by the subcommittee.

For cables over 1 KVA, class C stranding is recommended. Wire and cable specifications more than three years old are recommended for adoption by the American Standards Association.

Subcommittee 6—Packings. F. C. Thorn, Garlock Packing Co., chairman. The section headed by C. K. Chatten, Brooklyn Navy Yard, submitted a comprehensive report on the several types of equipment used in determining stress relaxation properties of rubber and on the results of a series of round-robin tests to decide if the several machines gave the same answer. Of the 11 devices surveyed, three were considered to have merit for use in a further testing program: the beam balance machine, the Garlock compression set plate assembly, and the Farnam-Cole relaxometer. The report recommended that the subcommittee undertake a program of testing using gaskets of the type required for bolted flanges, supplemented by tests using the beam balance machine, the relaxometer, and other appropriate instruments. The so-called "cold-to-coid" procedure was considered to simulate service conditions more closely than other procedures and is recommended for use in these tests.

The subcommittee chairman reported that a survey showed that seven out of eight persons object to the use of a ½-inch stock pellet for compression and relaxation testing in place of actual gasketing material. Sentiment is in favor of plyed-up commercial gasketing material.

The need of a stress-relaxation test for all ASTM committees dealing with elastomeric materials was pointed out.

Subcommittee 6 has decided not to proceed further with this work but to await the preparation of an overall stress relaxation test and then consider its adoption or modification for packing materials. A proposed tentative method of test for compressibility and recovery of gasketing was approved by letter ballot.

Subcommittee 10—Physical Tests. L. V. Cooper, chairman. No meeting of this subcommittee was held, but the chairman reported that the new revised D-412 on the Tension Testing of Vulcanized Rubber was in print in the new Committee D-11 book out in June. No further report

on the revision of D-15 on Methods of Sample Preparation for Physical Testing of Rubber Products was available.

Subcommittee 11—Chemical Analysis. W. P. Tyler, B. F. Goodrich Research Center, chairman. No meeting of this subcommittee took place, but a communication from the chairman stated that the revision of D-297 on Methods of Chemical Analysis of Rubber Products had been completed, and preprint copies are now available.

Subcommittee 12—Crude Natural Rubber. N. Bekkedahl, National Bureau of Standards, chairman. The method of the B. F. Goodrich Co. for determining dirt and foreign matter in natural rubber was submitted for examination and comment. The method of the American plant of the Dunlop company, which consists of straining one ton of rubber through a strainer with a screen having openings 0.020-inch in diameter and noting any reduction in rate, was described. A reduction in straining rate was followed by determination of the amount of dirt on the strainer screen. The importance of the proper sampling technique in connection with this or any other test on natural rubber was discussed, and among the several sources of assistance in this connection were mentioned the mathematical statisticians of the United States Department of Agriculture, the ASTM statistical group, and Fairfield Smith, formerly with the Malayan Rubber Research Institute and at present at the Institute of Statistics, Raleigh, N. C. A section for the preparation of a method of test for dirt in natural rubber was authorized.

There was much discussion of the proper compound and accelerator combination required for natural rubber evaluation work, and a motion was made and approved to form a section to study compounding formulae and test procedures for crude natural rubber. It will be the duty of this section first to determine whether or not the official markings on the bales of rubber produced in French Indo-China describe properly the physical properties of the rubber after arrival in this country. The section shall also collaborate with the rubber producers of Indo-China in studying the French system of classification of rubber and then decide whether or not it is in agreement with this system of grading.

A letter from W. J. Sears, executive vice president, The Rubber Manufacturers Association, Inc., expressing the interest of that organization in the laboratory testing of natural rubber was read.

Representation at the Akron meeting of ISO Technical Committee 45 on Rubber on October 18, at which the grading of natural rubber is to be discussed, was decided upon. Members of the subcommittee wishing to attend this meeting should contact Mr. Carpenter, secretary of Committee D-11.

Subcommittee 14—Abrasion Tests. R. F. Tener, chairman. A discussion of angle *versus* crescent specimens for tear testing, with special reference to the recent publications of J. M. Buist, Imperial Chemical Industries, Ltd., Manchester, England, was held, and F. L. Graves, American Cyanamid Co., was delegated to prepare for publication a rebuttal of Buist's criticism of the angle specimen.[1]

Sherman Doner, Raybestos-Manhattan, Inc., reported that the 42 abrasion samples from Office of Rubber Reserve had finally been distributed, after coding, to the several cooperating laboratories for evaluation. Some difficulty with the curing of some of the samples had been experienced, but the program, which is to include an attempt at correlation between the several laboratory abrasion methods and actual road wear tests, is to be continued.

The formation of a section to investigate standard compounds for abrasion testing and the proper ingredients to use in such compounds was voted.

Further refinement of the definition of what is meant by "average thickness of specimen" in connection with tear test samples is to be worked out.

Subcommittee 15—Life Tests. G. C. Maassen, R. T. Vanderbilt Co., chairman. No meeting of the full committee was held, but A. E. Juve, Goodrich Research Center, chairman of section 5 on ozone test methods, held a meeting of that section at which the "Tentative Method of Test for the Accelerated Ozone Cracking of Vulcanized Rubber" was discussed. The method was recommended for letter ballot.

An apparatus designed by G. F. Bush Associates, Princeton, N. J., for use with this method was on exhibition at Atlantic City.

Subcommittee 17—Hardness, Set and Creep. Sherman R. Doner, Raybestos-Manhattan, Inc., chairman. D-676 on Method of Test for Indentation of Rubber by Means of a Durometer was approved for adoption as a result of letter ballot. The German hardness measuring instrument first mentioned by Mr. Cooper in his paper[2] before the Rubber Division of the Chemical Institute of Canada in 1948 is now being manufactured by Bush Associates. The instrument, which will be available for distribution in September, is in accordance with ASTM specifications. Adjustment of the German-type instrument is possible by the purchaser without return to the manufacturer.

Round-robin tests on low-temperature compression set with GR-S compounds representing a non-crystallizing elastomer and neoprene, a crystallizing elastomer, were run at 22° F. and —40° F., with recovery values determined after 10 seconds and 30 minutes. The GR-S compound gave higher values at —40° F. and also for the reading taken after 30 minutes. Results with GR-S were not affected by conditioning; while with neoprene the conditioning did affect recovery values; these were greater with neoprene for the 30-minute readings. Reproducibility of tests was about the same with GR-S for both the 10-second and 30-minute readings; while for neoprene the reproducibility was better with the 10-second readings. A tentative test method is being prepared by the section.

In connection with D-395 on compression set testing a section was authorized to investigate the possible difference in results obtained when compression set jigs were loaded "hot" as compared with loading at normal temperatures.

Mr. Doner acknowledged the decision of subcommittee 6 on packings to await the preparation of a stress relaxation test for all rubber-like materials before deciding on a test for packings and stated that subcommittee 17 would set up a section to explore the whole field of stress relaxation and creep and that the scope of the investigation would include the possibility of the replacement of the compression set test with a stress relaxation method.

Subcommittee 18—Flexing Tests. B. S. Garvey, Jr., Sharples Chemicals, Inc., chairman. The description of the du Pont flexing machine in the present method D-430 was reported as not completely accurate, and appropriate changes in the descriptions were approved. Further work on the methods using the de Mattia and the Goodrich flexometers will be necessary. No further revision of the method where the Firestone or St. Joseph Lead flexometers are used will be required.

Subcommittee 19—Immersion Tests. R. M. Howlett, Enjay Co., chairman. In the absence of the chairman, Newlin Keen, du Pont, acted as chairman. The difference in the wording of D-471 as compared with D-735 with respect to volume of immersion medium will be rectified by use of the wording in the revised Federal Specification ZZ R601 A. It was recommended to D-11 that in D-471 the use of the swollen area for tensile strength calculations be continued instead of the method of calculation specified in D-735.

In connection with hardness determination after immersion it was recommended that D-471 be changed to require that immediately after removal of the specimen from the cool liquid, and after drying as specified, the durometer hardness number be determined according to D-676 and the change in hardness from the original noted.

ASTM reference fuel number 1 is to be used for cleaning immersion samples. Drying time is to be established by the subcommittee chairman.

A standard procedure for determining specific gravity and volume increase using the Jolly balance is to be worked out.

An investigation of the need of agitation in immersion tests in grease is to be made.

Subcommittee 21—Cements and Related Products. J. F. Anderson, B. F. Goodrich Co., chairman. It was stated that contrary to the footnote in D-553 on Methods of Test for Viscosity and Total Solids of Rubber Cements, the Precision Scientific Co. has advised that the falling cylinder viscosimeter mentioned therein is now available from that company.

The Rubber & Asbestos Co., Bloomfield, N. J., has suggested the use of silicone oils to improve the distillation analysis of rubber cements. Action on this suggestion was deferred to a later date.

Tentative methods of test for brake bonding adhesives were reviewed. High and low temperature effects on bonded brake lining are to be considered, and the scope of the method is to be increased to include evaluation of the "permanence" as well as the strength of the bond.

Subcommittee 23—Hard Rubber. H. J. Flikkie, Goodrich, chairman. The section on asphalt battery containers reported that the revisions of the bulge test and acid absorption test had been completed, and these tests are now ready for adoption. A method for the impact testing of asphalt composition is being written, but action on improving the hot-cold cycle test is being withheld for the present.

The committee is being reorganized in order to continue its program of work on physical testing of hard rubber, electrical tests, and tests on asphalt compositions.

Subcommittee 24—Coated Fabrics. S. H. Tinsley, Vanderbilt, chairman. The section on scrub and flex tests awaits new data being obtained on the modified du Pont abrasion machine. Abrasion tests with the Taber and Wyzenbeck machines have shown so much variation that no further work with these machines is contemplated. The Gardner 105 washability machine, originally designed for paint testing, may be applicable to coated fabrics, and tests will be run with this machine.

A further report by L. Bohr, Philadelphia Quartermasters Depot, on tests on unsupported vinyl film on the American Sheeting Co.'s edgewear testing machine was made. Subcommittee 24 plans to

[1] This rebuttal appears on page 534 of this issue of India Rubber World. Editor.
[2] See India Rubber World, Nov., 1948, p. 205.

check Mr. Bohr's results with this machine.

It was also stated that in the development of an abrasion test for coated fabrics the Schiefer and the Stoll machines would also receive consideration.

Subcommittee 25—Low Temperature Tests. R. S. Havenhill, St Joseph Lead, chairman. The section on brittleness testing reported that Committee D-20 on Plastics has agreed to the use of the du Pont and Graves machines for this test.

A representative of Phillips Petroleum Co. described the T-R test developed by that company. The subcommittee will investigate the amount of this type-testing being done.

Tests for torsional stiffness with the Gehman apparatus were discussed, with reference to five wires of various constants supplied with this machine. A round-robin testing program will be run to determine the range of torsion wire required.

Subcommittee 26 — Processibility Tests. R. H. Taylor, U. S. Department of Agriculture, chairman. The two negative votes in the letter balloting for approval of D-1077 were discussed, and it was decided that these votes were not such as to warrant further action. This method, entitled "Test for Determining the Curing Characteristics of Vulcanizable Mixtures during Heating by Means of the Shearing Disk Viscometer," has been accepted as a tentative method although further work is obviously required. The major difficulty seems to be the problem of accurate temperature measurement in the Mooney apparatus, and it was stated that this problem may require redesign of the machine.

The subcommittee chairman submitted a report in which he concluded that measurement of the temperature at specified points in platens, dies, or die holder may be satisfactory for control testing, but is not adequate for obtaining comparable temperatures from one machine to another for two reasons: (1) the temperature gradients from one machine to another vary widely both in pattern and degree; and (2) the viscosity of the test specimen has a pronounced effect on its temperature curve to which thermocouples in the dies are relatively insensitive.

Thermocouples conforming to the design specified in D-1077 appear satisfactory provided either ASTM Tentative Method D-1077 or Tentative Method D-927, depending upon the test to be made, is followed explicitly. There is no question about the results obtained with an individual machine.

For precise results in making cure tests with the Mooney viscometer, precise temperature measurements are essential, and if good reproducibility of the viscosity-time curve is required, accurate temperature control is just as important, it was said.

The plasticity method D-926, Method of Test for Plasticity and Recovery of Rubber and Rubber-Like Materials by the Parallel Plate Plastometer, has been a tentative method for more than two years without change and should be advanced to standard. Because the method was not considered to be in general use, however, it will remain as a tentative method.

SAE-ASTM Technical Committee on Automotive Rubber. S. R. Doner, chairman. Ten new members, five as representative of heavy-vehicle manufacturers and five as representative of rubber goods producers, have been proposed for membership on this committee to make its total 40.

All rubber heater hose specifications are to be approved, but specifications for rubber windshield wiper tubing will not be released.

The method for the standard identification of molded rubber parts has been established, and the SAE will forward the details to the RMA so that the assigned code numbers may be put into effect. The RMA will be the administrative agency for the operation of this method.

The use of the RS as well as the S-1 lamp in D-925 for measuring migration and stain of rubber in contact with organic finishes was approved.

Specification for auto mats awaits approval by the SAE.

New compound tables for D-735 on automotive and aeronautical products are ready for letter balloting. A new section is working out tables for high-temperature polymers such as silicone and polyacrylic rubbers.

Work is being done in an attempt to correlate weathering tests with ozone aging tests.

Section 6 on V-Belts has been quite active in reviewing Ordnance Department specifications covering V-belts and has contributed a considerable amount of work on an advisory basis to the Ordnance Department for a V-belt specification. In addition, a standardization of a 36-degree angle sheave or pulley for the narrow wedge belt was successfully letter balloted within the Technical Committee and is waiting final approval of the SAE Technical Board.

Specifications for brake cups have been revised to include those designed for heavy-duty service.

A new test for the determination of compressibility of gasket material is being developed.

Phillips' New SAF Black

SAF black, a new furnace carbon black developed by Phillips Petroleum Co., Bartlesville, Okla., promises to give increased abrasion resistance to tire tread compounds and to add more miles to tread life than are obtainable from any available carbon black, according to the company president, K. S. Adams.

The new black is produced from oil by a continuous process in pilot-plant equipment of unique design suitable for large-scale commercial plant production. Commercial carbon blacks range from the "soft" black of large particle size to the HAF black of small particle size. The new SAF black extends this range still further in the direction of even smaller particle size, since its particle diameter under the electron miscroscope is about three-fourths that of Philblack O, the company's HAF black.

Some physical and chemical properties of SAF black, in comparison with those of Philblack O, are as follows:

	SAF Black	Phil-black O
Surface area, sq. meters/gm.	143	80
pH	9.4	9.5
Volatile matter, %	2.1	1.14
Ash content, %	0.195	0.156
Moisture content, %	1.78	1.02
Benzene extract, %	0.17	0.07
Iodine adsorption, mg./gm.	145.9	88.5
Oil adsorption, cc./gm.	1.7	1.16

Electrical properties of the new black appear extremely interesting on the basis of preliminary test data. "Cold rubber" (41° F.) compounds loaded with 50 parts SAF black had resistivities approximately equal to those of similar compounds loaded with 50 parts of acetylene black.

In laboratory rubber evaluation tests SAF black stocks have shown 25-50% greater abrasion resistance than Philblack O in GR-S tread stocks, and 40-50% higher in 41° F. "cold rubber" compounds. In comparison with Philblack O, other properties imparted by SAF black to a GR-S tread compound are: slightly higher modulus and tensile strength with equal elongation; higher Shore hardness at equal loadings and softener levels; and slightly higher heat build-up. Other properties are substantially equal.

Stocks compounded with SAF black are somewhat stiffer than equivalent Philblack O stocks, but can be compensated for by use of additional softener with very little sacrifice in the superior abrasion resistance achieved with the new black. Further compounding studies are expected to develop other means of obtaining easily processible stocks with the new black.

The cost per pound of the SAF black will be somewhat higher than that of HAF blacks now on the market, but it is anticipated that cost per mile of tire life will be lower. Samples of SAF black have been distributed to leading tire manufacturers for laboratory evaluation and for processing into auto and heavy-duty tires for actual road tests. For the road test program the black will be compounded into treads of natural rubber, 41° F. "cold rubber," and the new 86° F. polybutadiene rubber recently announced by Phillips in cooperation with ORR. Final plans for full commercial production of the SAF black will be determined upon completion of the tire road tests.

Group Outings Held

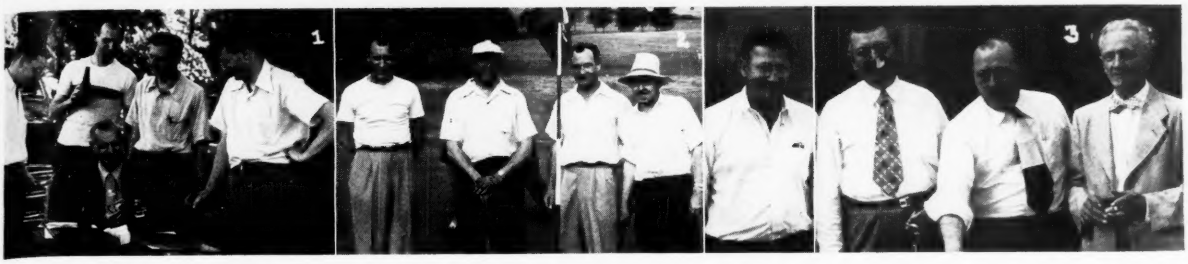
A HIGHLY successful outing was held by the Detroit Rubber & Plastics Group on June 23 at Forest Lake Country Club, Pontiac, Mich. Some 275 members and guests of the Group attended the outing, and approximately 150 participated in the golf tournament. Color motion pictures were taken at the golf tournament by Robert Chilton, Permalastic Products Co., and Edward Tillitson, Wayne University, and will be shown at the Group's fall meeting on October 6.

The program concluded with a dinner and entertainment, followed by the distribution of prizes to winning golfers. The prize for low gross went to William Holt, Goodall Fabrics, Inc.; George McCarthy, Gera Mfg. Co., had low net; high score went to Ernie Storfer, Chrysler Corp.; the prize for being closest to the cup went to H. W. Neale, Jr., Pioneer Latex & Chemicals Co.; and Robert L. Kreuz, Western Felt Works, took first prize in the kickers' handicap. Door prizes were also awarded to nearly 50 persons, and among these prizes was a musty, 50-year-old army saddle won by W. S. (Scotty) Meyers, Industrial Rubber Goods Co. Mr. Meyers has received the same "gift" twice before through the efforts of Victor A. Ford, Ford Motor Co.

Ray Cuthbertson, United States Rubber Co., was general chairman of the outing; he was assisted by Mr. Neale; Tom Halloran, Chemicals Products, Inc.; Walter Bauer, Brown Rubber Co.; Edward Kvet, Baldwin Rubber Co.; John Dudley, Chrysler Corp.; and Herb Hoerauf, U. S. Rubber.

Golf Features Rhode Island Outing

The annual summer outing and golf tournament of the Rhode Island Rubber Club was held on June 29 at the Meta-



At the Detroit Group Outing: (Fig. 1) ***Left to Right:*** **Walter Bauer, Tom Dabovich and Group Chairman George Wolf, Sharples Chemicals, Inc.; Herb Hoerauf, and,** ***Seated,*** **Ed Kvet; (Fig. 2) Nick Rakas, National Automotive Fibers, Inc., Brad Luce, Chrysler Corp., and Lloyd Wagner and Harry Wood, Baldwin Rubber. (Fig. 3) J. Stoner, Monroe Auto Equipment Co., Ed Briske, U. S. Rubber, Elden Henderson, Yale Rubber Mfg. Co., and Clacy McNary, Continental Rubber Works**

comet Golf Club, East Providence, R. I. Some 81 contestants played golf; while 150 members and guests were present at the dinner concluding the outing.

Golf prizes were won by the following: first low gross, William Newman, Detrex Corp.; second low gross, A. J. Urbanski, Korn Leather Co.; kickers' handicap, S. F. Long, J. Saner, L. L. Longworth, Monsanto Chemical Co., and J. E. Marshall, Collyer Insulated Wire Co.; high gross, John Gagne, Davol Rubber Co.; high net, E. A. Custer, American Zinc Sales Co.; nearest to hole, W. Rogers and P. G. Roach, United States Rubber Co.; longest drive, Mr. Urbanski; most sixes, Cass Cislo, Barrett Division, Allied Chemical & Dye Corp.; and most fours, Fred V. Newman, Respro, Inc. Fred Bartlett, U. S. Rubber, received a prize for the only birdie of the day.

Everyone attending the dinner received a door prize through donations received from 55 rubber and supplier concerns.

Boston Group Has Perfect Day

The Boston Rubber Group held its fourteenth annual summer outing on June 16 at the United Shoe Country Club, Beverly, Mass. As in the past, perfect weather prevailed, and the 450 members and guests attending enjoyed an afternoon of golf, tennis, horseshoe pitching, bowling, softball, and darts. The outing concluded with a dinner served under the "big top," followed by the awarding of prizes to winning contestants.

First-prize winners in the golf tournament follow: kicker's handicap, J. Beale; low gross, R. Nippes, Pittsburgh Plate Glass Co.; low net, E. G. Swanson; longest drive, F. A. Buskey, Firestone Tire & Rubber Co.; nearest to pin, W. G. Brown, Phillipp Bros., Inc.; high gross, Jack Andrews, General Latex & Chemical Corp.; and high net, W. Hartman, Barrett Division, Allied Chemical & Dye Corp. First prize in the softball tournament was taken by the team from American Resinous Chemicals Corp. Ed Weber and Phil Blanchard, both of Hood Rubber Co., teamed up to win the horseshoe pitching contest; while the tennis tournament was won by the team of Bill Walker, Hood Rubber, and Burt Smart. The dart contest was won by J. Van Vloten, and first prize in bowling went to Jack Corr, Tyer Rubber Co. Arrangements for the outing were handled by a committee comprised of A. L. Bryant, Binney & Smith Co., P. A. Uva, Avon Sole Co., and Harry Atwater, Hood Rubber.

Golf Tournament for Quebec Group

The annual golf tournament of the Quebec Rubber & Plastics Group was held on June 16 at Granby Golf Club, Granby, P.Q., Canada. Approximately 70 golfers participated, and 90 members and guests were present at the dinner concluding the day's program.

In the golf tournament, low gross went to C. G. Croakman, Binney & Smith Co., with second place to F. S. MacLean. H. Loiselle, Northern Electric Co., took low net, and second prize went to C. P. Dearth, Bolta Plastics. Approximately 40 door prizes were awarded through the contributions of many rubber, plastics, and supplier companies. The golf outing was a great success, and a vote of thanks was given to the committee in charge, comprising R. G. Davies, R. G. Rea, and H. Kushnarov.

The following slate of officers and directors was elected to serve for the 1950-51 season: chairman, N. W. Smith, Dominion Rubber Co., Ltd.; secretary-treasurer, Harry Kushnarov, Dominion Rubber; and directors, R. G. Davies, Canadian Industries, Ltd., A. G. Pinard, Canadian Resins & Chemicals, Ltd., R. G. Rea, Monsanto Chemical Co., Ltd., Mr. Kushnarov, C. W. MacEachern, General Latex & Chemicals, Ltd., M. L. Cameron, Canadian Titanium Pigments, Ltd., M. Renshaw, British Rubber Co., Ltd., and A. S. Johnston, Northern Electric.

Buffalo Group Has Successful Affair

The annual outing of the Buffalo Rubber Group was held on July 14 at the Lancaster Country Club, Lancaster, N. Y., with approximately 75 members and guests attending. Perfect weather prevailed, and the program included an all-day golf tournament, afternoon horseshoe pitching and softball tournaments, and an evening dinner with entertainment provided by a professional magician, Les Gilbert, Hercules Gasket Co. Door prizes and awards to winning contestants were distributed after dinner.

Arrangements for the outing were handled by Group Chairman John Augenstein, U. S. Rubber Reclaiming Co.; Outing Chairman George Bowher, Buffalo Weaving & Belting Co.; Earl Errick, U. S. Rubber Reclaiming, and Paul Sick, Hewitt-Robins, Inc., in charge of golf prizes; Gene Ciminelli, U. S. Rubber Reclaiming, in charge of the horseshoe pitching contest; and Ed Martin, Hewitt-Robins, softball tournament.

Successful Week-End for TLARGI

The annual summer outing of The Los Angeles Rubber Group, Inc., was held on June 17-18 at the Hotel Del Mar, Del Mar., Calif. The two-day affair, attended by 132 members and guests, began with a luncheon on June 17, followed by an afternoon of softball, tennis, badminton, shuffle board, horseshoes, open-play golf, water sports, indoor games, and fishing. The first day concluded with a cocktail hour and banquet at which entertainment was provided, with the balance of the evening devoted to card playing.

The annual golf tournament was held on June 18 at Rancho Santa Fe; while other sports activities were held at the Hotel Del Mar. The outing concluded with a luncheon session, the raffle prize drawing, and the distribution of door and contest prizes. Door prizes were won by W. A. Carr, Goodyear Tire & Rubber Co.; L. J. Tillotson; K. D. Coutois, United States Rubber Co.; M. Montgomery, Martin, Hoyt & Milne, Inc.; and Harold Sears, Stillman Rubber Co.

First-place prizes in the water sports contests were awarded as follows: longest underwater plunge, Allen Durnerin; biggest splash, M. A. McDonald, Pacific Hard Rubber Co.; water polo, the team captained by H. Jordan, E. I. du Pont de Nemours & Co., Inc.; and breast stroke swim, Mr. Jordan. The doubles team of Jack Knudson, Kirkhill Rubber Co., and Tway Andrews, H. M. Royal, Inc., took first prize in the tennis tournament; while the horseshoe pitching contest was won by the team of A. P. Stiller, Reeves Rubber, Inc., and C. Arends, California Rubber Products, Inc. Winners in the badminton doubles were J. Larkin, Patterson-Ballagh, Inc., and Leonard Boller, Technical Coatings, Inc. Elliott McLaughlin, H. M. Royal, and Mr. Montgomery teamed up to win the shuffleboard contest. Fred Thistle, Typrene Roller Co., took the prize for the largest fish; while the most fish were caught by Bud Burson, H. M. Royal.

H. Roquemore, Caram Chemical Co., won first prize in the Ten Dice game, and Mr. McDonald won the contest to guess the number of miles a tire had been run. Raffle prizes were won by John McSparran, C. P. Hall Co., Dick White, Caram Mfg. Co., and Miss McLaughlin. Prizes in the golf tournament were awarded to the following: blind bogey, Miles Reinke, Reinke & Amende; low net, Mr. MacDonald; low gross, Al Pickard, Braun Corp.; hole in one, Carl Dragna; longest drive, C. R. Wolter, Witco Chemical Co.; lowest total putts, Wendell Higbee, Southwestern Rubber Co.; longest putt, George Foos, C. K. Williams Co.; and highest score, Mr. Churchill.

New Synthetic Textile Fiber

A NEW synthetic textile fiber, known tentatively as Fiber V, is being evaluated on an experimental scale by E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del. Limited quantities of

suitings, curtains, shirts, and other products are being tested to determine the commercial possibilities of the new fiber. In the industrial field, evaluation is also being made in fire hose, V-belts, and other applications.

Technically, the material is a condensation polymer obtained from ethylene glycol and terephthalic acid. It was first developed in England where it bears the trade mark Terylene. Quantities of both continuous filament yarn and staple required for development work are being made at the Seaford, Del., plant of du Pont's nylon division, although the new fiber is not chemically related to nylon.

Like nylon and Orlon fiber, Fiber V appears to offer many properties of great interest to the textile industry. The fiber has high tensile strength and high resistance to stretching when wet or dry. It also has good resistance to degradation by chemical bleaches and to abrasion. Most of the fiber's properties are equally good under wet or dry conditions. A wide range of filament deniers is possible, and the fiber has good electrical insulation properties and is not weakened by fungus, mold, or mildew, it is further claimed. Fabrics made from Fiber V have excellent resilience and resistance to wrinkling, launder easily, dry quickly, and can be heat set.

L. A. Group Hears McMillan

THE last regular meeting of the 1949-1950 season of The Los Angeles Rubber Group, Inc., was held June 13 at the Hotel Mayfair, Los Angeles, Calif. Some 60 members and guests were present at the afternoon technical session at which Frank M. McMillan, Shell Development Co., spoke on "Plasticizing Action *vs.* Composition for Hydrocarbon Plasticizers."

Dr. McMillan stated that most of the plasticizers used by the rubber industry are hydrocarbons, including such diverse types as light paraffinic oils, crystalline waxes, viscous aromatic liquids, and solid resins and asphalts. For purposes of general classification, the behavior of a given hydrocarbon type in rubber may be described as a function of two factors: the size of the molecule (molecular weight); and its degree of aromaticity or polarity. The properties primarily dependent on molecular weight are plasticity, hardness, tensile and tear strength, cut-growth resistance, resilience, and hysteresis; those chiefly dependent on the polarity of the plasticizer are compatibility, incorporation time, tack, and stickiness. The way in which these properties vary with increasing polarity and molecular weight was discussed by the speaker, and the method of selecting a plasticizer for a particular application was illustrated by means of a typical example.

The evening meeting, attended by 160 members and guests, was United States Rubber Co. night. Dick Behrman, acting plant manager for U. S. Rubber in Los Angeles, was introduced, and in turn introduced 27 other U. S. Rubber men present at the meeting. After-dinner speaker was Roy Weatherby, noted hunter and gun expert, who described his trips to Africa where he proved that the velocity of a bullet is more important than its size in killing big game. The meeting closed with a drawing for 12 door prizes contributed by U. S. Rubber.

CALENDAR

May 30-Sept. 9.	World Transportation Fair. Santa Anita Park, Los Angeles, Calif.
Aug. 7-19.	U. S. International Trade Fair, Chicago, Ill.
Aug. 25.	Philadelphia Rubber Group. Summer Outing. Cedarbrook Country Club, Wyncote, Pa.
Sept. 3-8.	American Chemical Society, Chicago, Ill.
Sept. 5-9.	Chicago Section, A. C. S. Sixth National Chemical Exposition. Chicago Coliseum, Chicago, Ill.
Sept. 13.	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Sept. 18.	Rochester Section, SPE. Redmen's Club, Rochester, N. Y.
Sept. 20.	New York Section, SPE. Hotel Shelburne, New York, N. Y.
Sept. 22.	Chicago Section, SPE, and Midwest Chapter, SPI. Golf Outing. Skycrest Country Club, Libertyville, Ill.
Sept. 26-29.	Industrial Packaging & Materials Handling Exposition, Philadelphia, Pa.
Sept. 28-30.	American Association of Textile Chemists & Colorists. The Wentworth, Portsmouth, N. H.
Sept. 29.	Northern California Rubber Group, Claremont Hotel, Berkeley, Calif.
Oct. 2.	Philadelphia Section, SPE.
Oct. 3.	The Los Angeles Rubber Group, Inc., Hotel Mayfair, Los Angeles, Calif.
Oct. 6.	Detroit Rubber & Plastics Group. Fall Meeting.
	Chicago Rubber Group. Morrison Hotel, Chicago, Ill.
Oct. 9.	Upper Midwest Section, SPE.
Oct. 11.	Chicago Chapter, SPE, and Midwest Chapter, SPI. Builder's Club, Chicago, Ill.
	Newark Section, SPE. Military Park Hotel, Newark, N. J.
Oct. 11-13.	Division of Rubber Chemistry, A. C. S. Hotel Cleveland, Cleveland, O.
Oct. 16-20.	National Safety Congress and Exposition. Chicago, Ill.
Oct. 17.	Buffalo Rubber Group. Hotel Westbrook, Buffalo, N. Y.
Oct. 18.	New York Section, SPE. Hotel Shelburne, New York, N. Y.
	South Texas Section, SPE.
Oct. 18-20.	SPI. Annual Conference. New Ocean House, Swampscott, Mass.
Oct. 20.	New York Rubber Group. Henry Hudson Hotel, New York, N. Y.
	Boston Rubber Group. Somerset Hotel, Boston, Mass.
	Northern Indiana Section, SPE. Van Orman Hotel, Fort Wayne, Ind.
	Akron Rubber Group.
Oct. 24.	Association of Consulting Chemists & Chemical Engineers, Inc. Annual Meeting. Shelburne Hotel, New York, N. Y.
Oct. 27.	Washington Rubber Group.
	Northern California Rubber Group, Claremont Hotel, Berkeley, Calif.
Nov. 6.	Philadelphia Section, SPE.
Nov. 8.	Chicago Section, SPE, and Midwest Chapter, SPI. Builders Club, Chicago, Ill.
	Newark Section, SPE. Military Park Hotel, Newark, N. J.

New Process for Myrcene

MYRCENE, a useful chemical intermediate, can be produced from beta-pinene, a compound of gum turpentine, by a new process developed in the Southern Regional Research Laboratory, United States Department of Agriculture, New Orleans, La. Myrcene is a polyolefin with three double-bonds. It can be substituted for butadiene or isoprene in the manufacture of chemical rubber, reacted with maleic anhydride or other dibasic acids to form resins, and has many other uses which are well known in the chemical industry.

The new method of isomerizing beta-pinene to myrcene is based on the discovery that much higher yields and a better-quality product can be obtained at temperatures considerably above those ordinarily used, provided the vapor is subjected to such temperatures very briefly. United States patent No. 2,507,546 on the process has been granted to L. A. Goldblatt and T. R. Savich, of the Laboratory, and licenses to use the patent on a royalty-free non-exclusive basis may be obtained by applying to the Department of Agriculture, Bureau of Agricultural and Industrial Chemistry, Washington 25, D.C.

National Power Show

NEW developments in the field of power will be presented at the nineteenth National Exposition of Power and Mechanical Engineering, to be held in Grand Central Palace, New York, N. Y., November 27 to December 2. The show will be held under the auspices of the American Society of Mechanical Engineers in conjunction with the Society's annual meeting at that time.

I. E. Moultrop, consulting engineer, is chairman of the advisory committee for the Exposition, and J. H. Lawrence, consulting engineer, is vice chairman. Other members of the committee include L. T. Avery, president of the American Society of Heating and Ventilating Engineers; J. G. Bergdoll, Jr., president of the American Society of Refrigerating Engineers; J. D. Cunningham, president of the ASME; C. R. Earle, *Power Engineering;* D. M. Myers, consultant; Joseph Pope, Stone & Webster Engineering Corp.; L. N. Rowley, Jr., chairman of the ASME board on technology; R. A. Sherman, ASME director; A. B. Snavely, Hershey Chocolate Corp.; P. W. Swain, *Power;* and W. F. Thompson, Westcott & Mapes, Inc. The show is under the management of International Exposition Co.

New Sulfur Compound

THE availability of ethylene trithiocarbonate, a bright yellow to brown crystalline solid, has been announced by Stauffer Chemical Co., 420 Lexington Ave., New York 17, N. Y. The material contains more than 70% sulfur and may have value in the vulcanization of rubber. Other suggested applications include use as an intermediate in the manufacture of organic chemicals, as a flotation agent, sulfur solvent, and ingredient in extreme pressure lubricants. Samples and further data are obtainable from the company upon request.

Additional Experimental GR-S Polymers and Latices

ADDITIONS to the list of experimental GR-S dry polymers and GR-S latices, available for distribution to rubber goods manufacturers under the conditions outlined in our November, 1945 issue, page 237, appear in the table printed in the next two columns.

Normally, experimental polymers will be produced only at the request of the consumers, and 20 bales (one bale weighs approximately 75 pounds) of the original run will be set aside, if possible, for distribution to other interested companies for their evaluation. The 20 bales, when available, will be distributed in quantities of one bale or two bales upon request to the Sales Division of Rubber Reserve, or will be held for six months after the experimental polymer was produced, unless otherwise consigned before that time. Subsequent production runs will be made if sufficient requests are received.

These new polymers are experimental only, and the Office of Rubber Reserve does not make any representations or warranties of any kind, expressed or implied, as to the specifications or properties of such experimental polymers, or the results to be obtained from their use.

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description
X-512 GR-S-SP	U. S. Rubber, Naugatuck	3-23-50	Mooney viscosity changed to 55 ± 7 instead of 55 ± 5.
X-540 GR-S	Firestone, Lake Charles	11-21-49	Mooney viscosity changed to 52 ± 7 instead of 57 ± 7.
X-542 GR-S	Goodrich, Port Neches	2-6-50	Mooney viscosity changed to 52 ± 7 instead of 55.
X-556 GR-S	General, Baytown	3-23-50	Mooney viscosity changed to 42 ± 5 instead of 37 ± 5.
X-561 GR-S	General, Baytown	3-23-50	Shortstop Mooney viscosity is 41 ± 5.
X-562 GR-S	General, Baytown	3-23-50	Shortstop Mooney viscosity is 41 ± 5.
X-563 GR-S	U. S. Rubber, Borger	1-6-50	A mixture of 55 parts Kosmos 60 and 100 parts of GR-S polymerized at 41° F. reaction temperature, emulsified with Dresinate 214. Shortstopped with dinitrochlorobenzene. Mooney viscosity, 50. Stabilized with 1.5% BLE. Marasperse and caustic used in carbon black slurry make-up.
X-564 GR-S	General, Baytown	2-2-50	A mixture of 50 ± 2 parts Philblack O and 100 parts GR-S made at reaction temperature of 41° F. with a cumene hydroperoxide activated recipe emulsified with Dresinate 214 and K-ORR soap. Dresinate 214, sodium lignin sulfonate, and lignin used in carbon black slurry make-up. Shortstopped with dinitrochlorobenzene. Shortstop Mooney viscosity, 38 ± 4; stabilized with 1.5% PBNA.
X-565 GR-S-SP	U. S. Rubber, Naugatuck	2-6-50	GR-S made at 41° F. reaction temperature with a cumene hydroperoxide activated recipe emulsified with K-ORR soap. Shortstopped with sodium dimethyl dithiocarbamate. Mooney viscosity, 55 ± 7. Stabilized with 1.5% UBUB. Glue-acid coagulation.
X-566 GR-S	General, Baytown	3-3-50	A mixture of 75 parts of Philblack A and 100 parts of GR-S-26. Stabilized with 1.5% Wingstay S antioxidant. Marasperse used as dispersing agent in carbon black slurry make-up.
X-567 GR-S-SP	U. S. Rubber, Naugatuck	3-3-50	Same as GR-S-85-SP, except stabilized with 1.25% Stalite.
X-568 GR-S	Goodyear, Houston	3-21-50	GR-S polymerized at 41° F. reaction temperature, emulsified with Dresinate 214 and K-ORR soap. Activated with cumene hydroperoxide or diisopropyl-benzene monohydroperoxide or mixture of both and tetraethylene pentamine. Shortstopped with sodium mercaptobenzothiazole. Mooney viscosity, 47 ± 7. Stabilized with 1.5% Wingstay S.
X-569 GR-S	General, Baytown	3-23-50	A mixture of 50 ± 2 parts Philblack A and 100 parts of GR-S polymerized at 41° F. Sodium lignin sulfonate-type emulsifying agent used in preparation of carbon black slurry. Cumene hydroperoxide activated recipe emulsified with K-ORR soap and Dresinate 214. Shortstopped with dinitrochlorobenzene; stabilized with 1.5% PBNA. Shortstop viscosity of latex, 42 ± 5 Mooney.
X-570 GR-S Latex	U. S. Rubber, Naugatuck	3-27-50	GR-S latex, charge ratio similar to Type II, polymerized at 41° F. reaction temperature. Activated with cumene hydroperoxide; emulsified with K-ORR soap. Shortstopped with dimethyl ammonium dithiocarbamate. pH, 9.0-10.0; total solids, 22-25%.
X-571 GR-S	U. S. Rubber, Borger	4-4-50	A mixture of 55 parts Philblack O and 100 parts GR-S polymerized at 40° F.; 71.5:28.5 butadiene styrene charge ratio. Marasperse plus NaOH is used for Philblack O slurry makeup. Emulsified with Dresinate 214. Shortstopped with hydroquinine and hydrogen peroxide. Activated with CHP; stabilized with 1.5% BLE. Shortstopped Mooney viscosity of latex, 50.
X-572 GR-S	U. S. Rubber, Borger	5-12-50	GR-S made at 41° F. reaction temperature with a cumene hydroperoxide activated recipe, emulsized with Dresinate 214. Shortstopped with hydroquinone and hydrogen peroxide. Mooney viscosity, 50. Stabilized with 1.25% BLE.
X-573 GR-S	U. S. Rubber, Borger	5-26-50	A mixture of 55 parts Huber Aromex HAF black and 100 parts GR-S polymerized at 41° F. Marasperse used in carbon black slurry make-up. Emulsified with Dresinate 214; activated with cumene hydroperoxide. Shortstopped with hydroquinone and hydrogen peroxide. Shortstopped Mooney viscosity of latex, 50. Stabilized with 1.5% BLE.
X-574 GR-S	Goodyear, Houston	6-6-50	Similar to X-529 GR-S; a mixture containing 50 ± 2 parts EPC black and 100 parts of the same GR-S polymer used in GR-S-Black III except that butadiene/styrene charge ratio is 75:25. Mooney viscosity, 37 ± 4; stabilized with 1.5% PBNA. Sodium lignin sulfonate-type emulsifying agent used in carbon black slurry make-up.
X-575 GR-S	Goodyear, Houston	6-6-50	Same as GR-S-20 except that the butadiene/styrene charge ratio is 75:25.
X-576 GR-S	Goodrich, Port Neches	6-9-50	Same as GR-S-18 except that the butadiene/styrene charge ratio is 75:25.
X-577 GR-S	Goodrich, Port Neches	6-6-50	Charge ratio, 75:25 butadiene/styrene, polymerized at 41° F. and emulsified with Dresinate 214. Activated with cumene hydroperoxide; shortstopped with dinitrochlorobenzene and sodium nitrite. Mooney viscosity, 52 ± 7. Stabilized with 1.25% Stalite.
X-578 GR-S	Copolymer, Baton Rouge	6-6-50	Similar to X-478 GR-S, except 75:25 butadiene/styrene charge ratio. Polymerized at 41° F.; emulsified with Dresinate 214; activated with cumene hydroperoxide; shortstopped with DNCB; and stabilized with 1.5% PBNA. Mooney viscosity, 55 ± 7.
X-579 GR-S	U. S. Rubber, Borger	6-7-50	Similar to X-457 GR-S, a mixture containing 55 parts Philblack A and 100 parts of the same GR-S-type polymer as used in GR-S-Black 1 except butadiene/styrene charge ratio is 75:25. Mooney viscosity, 37 ± 4. Stabilized with 1.5% BLE. Daxad 11 and NaOH used in carbon black slurry make-up.
X-580 GR-S	U. S. Rubber, Borger	6-7-50	Similar to X-571 GR-S, a mixture of 55 parts Philblack O and 100 parts of low-temperature polymerized GR-S. Marasperse and NaOH used in carbon black slurry make-up. 75:25 butadiene/styrene charge ratio, emulsified with Dresinate 214. Activated with CHP; shortstopped with hydroquinone and hydrogen peroxide. Shortstopped Mooney viscosity of latex, 50. Stabilized with 1.5% BLE. Polymerized at 41° F.
X-581 GR-S	U. S. Rubber, Borger	6-7-50	Similar to X-573 GR-S, a mixture of 55 parts Huber Aromex HAF black and 100 parts of low-temperature polymerized GR-S. Marasperse used in carbon black slurry make-up. Charge ratio same as for X-580 GR-S.

(*Continued on page 574*)

Plant Maintenance Show

THE second Plant Maintenance Show will be held on January 15-18, 1951, at the Auditorium in Cleveland, O., it has been announced by the exposition management, Clapp & Poliak, Inc. Present indications are that the show will be two or three times the size of the first exposition held early this year. Some 120 companies have already leased booth space exceeding by 61% the total area of the first show. Also to be repeated will be the Plant Maintenance Conference which attracted an attendance of some 1,500 engineers and executives at the initial show.

On exhibition at the show will be equipment and materials for air conditioning, heating, and ventilating; building materials and services; maintenance tools and supplies; electrical equipment; displays on employe relations, training, and safety; instruments, meters, and gages; lubricants and lubricating equipment; management consultants and services; materials handling; mechanical rubber goods; paints and coating equipment; power generation, distribution, and transmission welding, and gas cutting.

Emersol 132 Price Reduction

A REDUCTION in the price of Emersol 132 Lily Stearic Acid, a premium-quality product, to the level of regular triple-pressed stearic acids has been announced by Emery Industries, Inc., Carew Tower, Cincinnati 2, O. The price reduction is said to be the direct result of lower processing costs made possible by increased production efficiency and sales volume. Emersol 132, it is claimed, provides the highest quality stearic acid (iodine value, 1.0 max.), greatest resistance to oxidation, best initial color and odor, stability of color and odor, highest resistance to rancidity, constant composition, and uniformity of quality.

RUBBER WORLD
NEWS of the MONTH

Three Synthetic Rubber Plants to Be Reactivated; Korean War Boosts Peak Demand Still Higher for Rubber Products

Following the outbreak of war in Korea on June 25, the NSRB, after a meeting of the National Security Policy Committee of the rubber industry with John R. Steelman, ordered the RFC to reactivate the Port Neches, Texas, 75,000-ton a year GR-S plant; an additional facility at Baton Rouge, La., capable of producing 13,000 tons of Butyl rubber a year; and a butadiene plant in Houston, Tex., designed to produce 50,000 short tons of butadiene a year. Other industry recommendations for a GR-S stockpile and further increases in GR-S production to 50,000 long tons a month by January, 1951, were not acted upon.

Production and shipments of tires and tubes reached a new high level in May, and it was expected that this level would be maintained or exceeded in June and possibly in July. The production of other rubber goods was also headed toward new peaks, judging by the continuing consumption of rubber in June at the rate of 1,300,000 long tons a year. Natural rubber prices rose again in July to reach a 50¢ a pound figure for No. 1 RSS, and even before this figure was reached, tire prices for both original equipment and replacement uses were advanced 5% to 10% or more by most companies. Scare buying and hoarding of tires increased dealer sales from 100 to 700% in mid-July, but an ample manufacturers' inventory was expected to aid in returning tire sales to more normal levels in a short time.

Government industrial mobilization plans were not expected to cause any great changes in the rubber industry since ample powers for priority and allocation of natural and synthetic rubbers are still available in the Rubber Act of 1950.

An increase in the number of wildcat strikes which plague the industry from time to time was noted in July, and one such strike in the tire plant of The B. F. Goodrich Co. in Akron was the result of too high a production rate for three tire builders. When these three tire builders would not lower their production, other members of the local URWA union walked off the job in protest.

The international policy committee of the URWA met in Columbus, O., July 24 and 25 to discuss how much of a wage increase to ask from the various rubber companies.

Indonesian Reply on Rubber Price

The Indonesian Government through its Embassy in Washington, D. C., by Mohammed Ismail Thajeb, commercial counselor, presented information to the United States State Department on June 27 relating to the problems of natural rubber, in view of the press release on this subject issued by the State Department on June 9.

Two main points were made by the Indonesian Government: the first, that the price of natural rubber has not increased so rapidly as that of the commodities which Indonesia must buy in the United States, and that any lower price than the present one would seriously affect Indonesia's ability to purchase in the United States; and the second, that a decrease in the price of natural rubber at this time would adversely affect the supply. The goals set for Indonesia at the Rubber Study Group meeting in Brussels of 520,000 tons will only be met if prices remain at encouraging levels, it was said.

Figures were presented to show that although Indonesian exports of natural rubber were at a low level in January and February, recent months have shown a sharp increase in exports which is expected to be maintained as long as prices remain attractive to the grower.

Other points made in the Indonesian reply were that the world supply/demand situation for rubber has become tighter as compared to a year ago, that January/April, 1950, natural rubber supplies moved at approximately the same level as during the same period of 1949, while during the 1950 period world consumption has considerably increased. Also, this increase in consumption is very considerable in the United States, and it is caused by the continued high level of prosperity in this country. Stocks in the United States were low in anticipation of the devaluation in rubber growing countries and of increased supplies and lower prices which that devaluation was expected to bring about; also some fear of a recession existed. These expectations did not materialize, and replenishment of stocks in addition to a steadily increasing demand had their effect on prices.

Finally, it was said that stability in price is desirable, but not always feasible in view of the unavoidable variations in supply and demand; the foregoing shows that in the period under consideration the variations in demand were larger than those in supply.

Litchfield on Rubber Situation

In a review of the current rubber situation, released late in June at about the time of the outbreak of the Korean war, but not written in anticipation of it, P. W. Litchfield, chairman of the board, Goodyear Tire & Rubber Co., declared that the nation's supply of natural rubber is too low from the standpoint of national security and the price is too high for economic stability.

Litchfield warned that statistically the rubber picture in this country is worse than was the case just prior to Pearl Harbor.

As an effective remedy he urged that the government proceed at once to step up production of synthetic rubber to 50,000 long tons a month, and that it start the creation of a stockpile of 200,000 tons of synthetic rubber for possible national emergencies.

The nation's state of unpreparedness in the matter of rubber supply is in strange contradiction to other vast moves being made by the government to protect our national security, Litchfield declared.

A warning against further dispersal of government-owned synthetic rubber plants and responsibilities for their operation was made, and that fact that disposal of three styrene producing plants, originally components of the government's synthetic rubber producing facilities, had aggravated the present situation was cited in this connection.

"The American synthetic rubber industry," Litchfield stated, "is, above all, a weapon of national defense. Our economy and our national security primarily depend upon mobility, and mobility, in turn, depends upon rubber."

In reviewing the developments of the past year Litchfield said the price of natural rubber had jumped from 16 to 35¢ a pound, while GR-S remained pegged at 18½¢. He pointed out that every increase of 1¢ a pound in natural rubber means an additional $15 million per year out of the pockets of American consumers. The demand for rubber has far exceeded earlier forecasts owing to the continuing boom in the automotive industry, and, too, the resumption of buying of natural rubber by the government for stockpiling purposes has tended to boost prices.

At the same time, our reserves of synthetic rubber were permitted to dwindle, feed stocks were and continue to be precariously short, and thus synthetic no longer exerts a restraining influence on the competitive price of natural rubber.

Serious political instability in Indonesia and threats of Communism in Malaya and Indo-China are factors underlying the market, too, since 90% of the natural rubber supply comes from those countries, he said.

"Such excessive prices and instability in the rubber market as now prevail," Litchfield continued, "are not economically healthy in the long run."

He added that there has been an increase in the flow of American dollars to the dollar-short countries from which we import rubber, and perhaps this has been viewed with sympathetic indulgence in certain government circles.

Soaring prices and acute shortages of both dry and liquid rubber will tend to stifle prospects for larger use of foamed rubber products, for rubber paving material, and in other potential fields, he warned. Rubber growers and governments in rubber growing countries are fully aware of these dangers and prefer to avoid them in the interest of future economic expansion and stability; the growers would be entirely happy with a price of 22¢ a pound or thereabouts.

Firestone Comment on Rubber

In order to avert a possible "rubber crisis" caused by Communist activity in the Far East, Harvey S. Firestone, Jr., chairman of the Firestone Tire & Rubber Co., on July 6, asserted that "at least two, if not more, of our standby synthetic rubber plants should be made ready for production as quickly as possible.

"There is also the problem of sufficient raw materials for increased synthetic rubber production. Preparations will have to be made for stepping up butadiene production, and the present bottleneck in the supply of styrene will have to be solved.

"Unfortunate as the Korean situation is, it may have a beneficial effect upon the rubber-producing areas of Southeast Asia. At least it will focus attention upon

the conditions which exist there. There has been an increasing amount of Communist and terrorist activities in Malaya and Indonesia since the war. In some parts rubber production has been at a standstill due to the danger of attack from guerrillas and Communist bandits. Hundreds of plantation workers and managers have been killed.

"If there is to be an assured supply of natural rubber, these conditions will have to be corrected. Ninety per cent of natural rubber comes from that part of the world, and if its production were to be seriously curtailed in the immediate future, we would face another rubber crisis until we could get our synthetic rubber industry going at full capacity."

RMA Recommendations

In a release dated July 6 The Rubber Manufacturers Association, Inc., stated that the industry had on that date recommended to the White House a four-point program designed to bulwark this nation's security position in rubber against the spreading threat of Communism in Far Eastern producing areas. In a memorandum submitted to John R. Steelman, the industry advocated:

1. That immediate and vigorous action be taken to open additional copolymer facilities and provide the necessary components to raise GR-S production to 40,000 long tons a month. Production in June was about 30,000 long tons.

2. That the government in the interest of military security and economic stability be prepared to provide by January 1, 1951, 50,000 long tons of GR-S per month.

3. That Reconstruction Finance Corp. be authorized to build and maintain a substantial inventory of GR-S over and above the normal commercial inventories carried by industry and by Rubber Reserve.

4. That all available standby capacity for Butyl production be reactivated immediately.

Dr. Steelman assured the industry group that he would immediately pass along its proposals to Stuart Symington, chairman of the National Security Resources Board, for consideration by that agency.

The following were the members of the subcommittee of the National Security Policy Committee of the industry that submitted the memorandum at the meeting with Dr. Steelman: Frank Hendrickson, president, American Hard Rubber Co.; A. L. Freedlander, president, Dayton Rubber Co.; Harvey S. Firestone, Jr.; C. F. Burke, assistant to the president, General Tire & Rubber Co.; John L. Collyer, chairman and president, Goodrich; R. S. Wilson, vice president, Goodyear; H. P. Schrank, vice president, Seiberling Rubber Co.; G. M. Tisdale, vice president, United States Rubber Co.; A. L. Viles and W. J. Sears, president and vice president, respectively, RMA.

Plant Reactivation Ordered

Harley Hise, chairman of the RFC, on July 7 announced that the RFC is making arrangements for reactivation of three government-owned synthetic rubber facilities which will increase the country's annual production of synthetic rubber by approximately 88,000 tons.

On July 13, RFC announced that U. S. Rubber will reactivate and operate the GR-S copolymer plant at Port Neches, Tex. The first unit is expected to be in operation in early October, and the full capacity in operation, producing at a 75,000 long tons a year rate, on November 1.

Sinclair Rubber Co. will reopen the petroleum butadiene plant—with a design capacity of 50,000 short tons—at Houston.

Esso Standard Oil Co. will reopen and operate an additional Butyl facility—producing 13,000 tons a year — at Baton Rouge, La. This facility is expected to be in production in late November or early December.

The Phillips Chemical Co. (Phillips Petroleum) will operate the 45,000-ton-a-year Borger, Tex., GR-S plant, taking over its operation from U. S. Rubber.

All told, these steps will bring GR-S production up to about a 500,000-ton-a-year rate, and Butyl production up to a 75,000-ton-a-year rate.

This leaves in the rubber program standby facilities capable of producing approximately another 100,000 tons of GR-S using petroleum butadiene and an additional 200,000 tons of GR-S using alcohol butadiene.

Our Washington correspondent, Arthur J. Kraft, has pointed out that although the decision to reactivate GR-S and Butyl plants was shaping up before the Korean fighting broke out, this new threat to natural rubber supplies probably helped it to conclusion.

For one thing, the rubber products manufacturing industry, which pressed for such action through its National Security Policy Committee, picked up a valuable ally in Senator Lyndon Johnson (D., Tex.), chairman of the Senate Armed Services rubber subcommittee.

Only a month earlier, Johnson had concurred with then prevailing RFC opinion, shared by many other government agencies (with General Services Administrator Jess Larson a notable exception), that reactivation of additional GR-S capacity was not particularly desirable, that shortages of styrene made it impracticable, and that the accumulation of a sizable working inventory of GR-S should not be undertaken.

Johnson changed his mind quickly. In conferences with RFC and other officials, he urged reactivation to the level proposed by the RMA and pressed its case for the working inventory. This urging he did immediately after war broke out in Korea.

In a Senate speech, July 12, he called upon the President to make the "fullest possible use of the present provision in the Selective Service Act enabling the Federal Government to place priority orders for all material essential for the Armed Forces. . . . The priority provision," he added, "could certainly be used to break such bottlenecks as the styrene shortage now handicapping the output of synthetic rubber."

In a statewide radio address to fellow Texans on July 18, Johnson proposed a six-point "minimum program we should undertake now" to meet the threat of spreading conflict. Point 6 was: "Reactivate our essential war production plants which are still owned by the government, especially the synthetic rubber plants which are still in standby status." It was reported that he meant all standby plants in the government program.

Commencing about July 15, it became evident that RFC was busily engaged in planning some means of getting its hands on more styrene. Early in the month, officials there spoke optimistically of being able to buy all they need on the open market. By mid-month, these officials responded, "No comment," to inquiry as to whether the government plans to invoke its priority powers for styrene.

The Munitions Board's rubber industry advisory committee meeting July 25, discussed the industry proposal, presented on July 6 to Dr. Steelman, to increase GR-S production to a 600,000-ton annual rate by January 1, 1951. As far as it could be ascertained, such action is not being contemplated. Administration officials will wait until at least September to see what effects war-scare tire hoarding has on demand for rubber products. They expect some easing off in demand for tires and consequently for GR-S.

Apparently only a direct, Soviet prompted thrust at natural rubber producing countries or spreading conflict elsewhere will bring favorable action on the 600,000-ton-a-year demand. That feeling was the predominant one in a grim, but not alarmed capital in late July.

At that time rubber officials in government were pointing out that industry was using rubber at an annual rate of 1,300,000 tons, and that even some contractions in that rate—because of a tight GR-S picture before new production comes in around November 1—would still put consumption at a peak rate. These officials were unanimous in expecting the pressure on rubber to ease before then through a post tire-hoarding slack in demand.

Those who keep a sharp eye on natural rubber developments felt fairly assured that the United States had received about 120,000 tons of Natural rubber in June and July, maintaining the 62,000-ton a month average rate of the first five months of 1950. Barring some unforeseen interference, they expected Indonesia to exceed the 520,000 tons, export goal for 1950 announced at Brussels in May. Shipments from that country set a postwar record in April and bettered it in May. The rise in prices put an end to withholding rubber from the market in Indonesia, they said.

Collyer Comment on Reactivation

Following the government's announcement that standby facilities for producing synthetic rubber will be reopened, Collyer of Goodrich, who made the original request for such action in May, expressed gratification that the government will take appropriate action to make available, as speedily as possible, additional supplies of synthetic rubber.

"The B. F. Goodrich Co.," he said, "has consistently advocated, in addition to maximum production of general-purpose American rubber in facilities now operating, and the stockpiling of GR-S rubber, that at least one standby copolymer plant be put into operation as quickly as possible."

Tire and Other Price Increases

A statement made at the end of June by Raymond H. Blanchard, president of the Hood Rubber Co., regarding the need of higher wholesale prices for waterproof footwear was echoed by tire and tube manufacturers during July, and for these latter items price increases were actually made.

Blanchard said his company, a division of B. F. Goodrich, will consider a boost in wholesale prices to offset higher production costs due to rising natural rubber prices and other increased manufacturing costs, as soon as advance season's orders are filled. It was pointed out that although hourly wage rates at Hood have not advanced since August, 1948, pension and welfare costs have increased substantially, following the national pattern of 10¢ an hour. Approximately one-half of the total costs in footwear production are labor, Blanchard added.

On July 12, citing higher prices for rubber and other raw materials, as well as increased manufacturing costs, Firestone announced an increase in passenger-car tires of from 8% to 10%, 12½% for truck and bus tires, and 60% for tractor and farm implement tires to original manufacturers. This action was followed about a week later by an increase of 5% on passenger-car tires sold in the replacement market, 7½% on truck and bus tires, 5% on tractor and farm implement tires, 7½% on industrial solid truck tires, and 5% on synthetic inner tubes.

Similar increases were instituted during July by General Tire, Goodrich, Seiberling, Goodyear, U. S. Rubber, Dayton, and Lee Rubber & Tire Corp. The price hikes were for about the same amounts as announced by Firestone. All companies gave higher raw material and other manufacturing costs as the reasons for their action. It was emphasized, however, that since the war practically every commodity has increased in price more than tires and that for a long time tire prices have been too low in relation to costs.

Industry Production and Trends

Industry production in all lines and most particularly in tires and tubes continued at peak levels during July, with the outlook for some shift to a greater production of military rubber goods as a result of the outbreak of war in Korea. Whether or not the production of goods for domestic production will suffer because of increased production for the military is unknown, but the tight rubber supply situation may work some hardship with producers of less essential items.

The Korean war was the cause of a wave of scare buying of tires, and William O'Neil, president of General Tire, as early as July 5, in newspaper advertisements from coast to coast stated that despite false rumors, there is no reason for anyone to be stampeded into buying tires through fear of rationing.

"There is no shortage of tires. No threat of one. All rubber manufacturers have plenty of tires to sell. . . . This time of the year it is a normal thing for dealers not to be able to make immediate delivery of all sizes of our top lines," were some of the points made by O'Neil in his statement.

Scare buying and hoarding of tires, however, continued in varying degrees in various sections of the country during July. *Tires Service Station*, another Bill Brothers publication, by means of a telegraphic survey in mid-July of prominent tire dealers in 20 important trading areas across the country, determined that sales of tires had increased from 100 to 700% above those of a month ago.

"The rush of buying by both car owners and, in the larger centers, commercial accounts, has depleted many dealers' stocks, in some cases almost to the vanishing point. Unable to keep abreast of the demand, tire manufacturers have placed their branches on an allotment basis, and in scattered cases dealers have restricted sales to customers, particularly commercial accounts," the *Tires Service Station* report stated.

The RMA in its tire production and shipment report of July 10 for the month of May, revealed that the production of passenger tires reached a new all-time high of 7,369,190 units during that month. The previous monthly production record was 7,365,790 units established during October, 1947. May passenger tire production was 13.9% above that of April, 1950, when 6,468,984 units were produced.

Shipments of passenger tires during May also reached a new peak since October, 1947, and amounted to 7,276,860 units, 13.8% above the previous month's shipments of 6,396,173 units. Despite heavy shipments during the first five months of 1950, production has been stepped up so that inventory at the end of May was 10,364,646 units, slightly higher than April's 10,353,930 units and above the 8,903,731 units on hand at the end of 1949.

Truck and bus tire production increased 13.1% during May to 1,259,897 units, as compared with the previous month's 1,114,443 units. Shipments of 1,244,281 units were 10.2% above April's 1,129,389 units. Inventory was up to 2,002,692 units, against April's 1,986,705 units.

Production of automotive inner tubes rose 12.8% to 7,089,327 units from 6,285,414 units of the previous month. Shipments of 6,687,925 units were 9.8% above the 6,093,969 units shipped in April. Inventory increased 3.4% to 12,109,933 units, compared with 11,710,259 units on April 30.

Although the tabulation of tire and tube production, shipments, and inventory for the month of June was about two weeks off at this writing (July 24), it is understood that the June figures will be even higher than May, with passenger tire shipments running above 8,000,000 units. With the existing production rate the inventory may be lowered somewhat, but in any event more than 9,000,000 tires should still have been available in the inventory at the end of June.

The Department of Commerce on July 21, in connection with an analysis of rubber consumption in the United States in May, stated that the shift from use of natural rubber to GR-S which began in March continued in May in the manufacture of both transportation and non-transport goods.

Tremendous tire production pushed May new rubber consumption in the transportation field to 74,999 tons, only 1,971 short of the January, 1947, record. Although consumption of natural rubber in this segment of the industry reached a postwar high of 44,107 tons in May, consumption of GR-S soared to 24,931 tons, the highest in 29 months, and the GR-S ratio to total natural plus GR-S consumption increased to 36% from 33% in April.

In the non-transport segment, May new rubber consumption established a new high of 35,212 tons, up 1,013 tons from the previous record of 34,199 tons set in March of this year. Natural latex consumption in this segment set another new record of 4,200 tons, 58 tons higher than the March, 1950, figure.

In the first five months of 1950 new rubber consumption in the transportation field totaled 323,320 tons, up 10.7% from the 292,085 tons reported in the same period of 1949.

New rubber consumption in the non-transport field totaled 163,784 tons in the first five months of 1950, up 22.5% from the 133,720 tons used January-May, 1949.

The Bureau of Labor Statistics of the Department of Labor also commented on July 1 on increased activity in the tire and tube branch of the industry.

A sharp increase in demand for tires during the first four months of 1950 brought the tire and tube industry out of a two-year slump, BLS said.

The rise reflected record breaking automotive production, accelerated purchasing of tire replacements, and inventory stock-building. Production-worker employment in April, 1950, totaled 84,000—2.3% above that of December, 1949. Weekly hours for the industry in April, 1950, averaged 39; in December, 1949, they were 37.3. Since a large segment of the industry has a normal work week of 36 hours, the current work schedules reveal a substantial amount of overtime.

The trend of employment in the tire and tube industry has been downward since the first quarter of 1947. Production-worker employment dropped from 106,000 in 1947 to 84,000 in 1949—a 21% decline.

The trough of the decline was reached in mid-1949; since then the industry has been expanding operations. Employment rose 4% between August, 1949, and April, 1950. Over the same period weekly hours increased from 36 to 39, the BLS said in conclusion.

Another measure of industry activity, new rubber consumption for June, was estimated by the RMA on July 28 as having reached a new monthly record of 110,792 long tons. The June total compares with the 110,010 long tons used in May, 1950, which was itself a record total and with 84,328 long tons used in June, 1949.

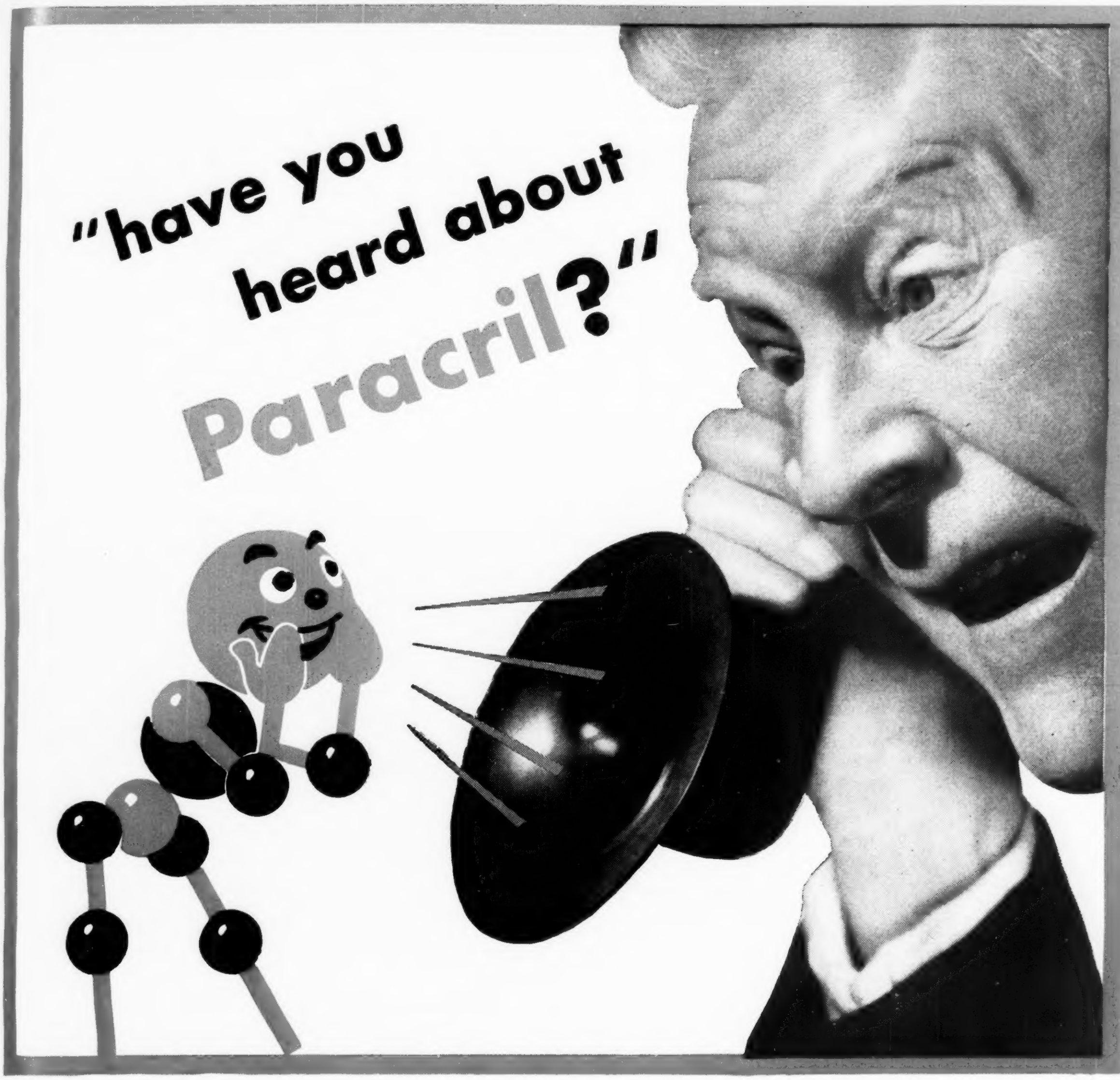
Use of natural rubber in June amounted to 62,546 long tons, 1.7% lower than the May figure of 63,641 tons.

Consumption of synthetic rubbers rose 4.1% in June to 48,246 long tons from 46,369 tons in the previous month. A breakdown of June synthetic consumption showed GR-S at 36,874 tons, neoprene at 3,671 tons, Butyl at 6,081 tons, and nitrile types at 1,620 tons.

FTC U. S. Rubber Footwear Order

The Federal Trade Commission, on July 10, ordered U. S. Rubber to discontinue its present pricing policy on rubber footwear on finding that the company violated Section 2(a) of the Clayton Act, as amended by the Robinson-Patman Act. The Commission directed the company to refrain from "directly or indirectly discriminating in the price of waterproof or canvas footwear by charging or receiving from different purchasers of such products of like grade and quality net prices that differ as much as, or more than, 2% of the highest of such net prices." The order provides that the company may defend any alleged violation of the order "by showing that the different prices make only due allowance for the differences in the cost of manufacture, sale, or delivery resulting from differing methods or quantities in which the products were sold or delivered."

Noting that "exhaustive cost studies" were conducted and made a part of the record, the Commission said the stipulated testimony of its accountants "is to the effect that certain of respondents price differences . . . were justified by differences in cost of manufacture, sale, and delivery." This testimony showed, according to the findings, that cost differences justified the lower prices granted national chains and mail-order houses on private brand footwear, as compared with the higher prices at which advertised and unadvertised brands of footwear of like grade and quality were sold to other retailers through the company's branch store system.



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The Commission found, however, that some of the price differences on advertised and unadvertised brands of footwear sold to retailers under the branch store system exceeded the differences in the cost of manufacture, sale, and delivery by amounts ranging from $0.0047 to $0.0480 per dollar of gross sales.

The findings point out that the unjustified price differences of less than 1¢ per dollar of gross sales "would be considered by the Commission to be *de minimus*" and, if they were the only price differences found to be not justified by differences in costs, "would not warrant the issuance of an order to cease and desist." The Commission added, however, that "the other amounts by which the differences in costs fail to justify the differences in prices are substantial."

RFC Transfer Defeated

The Senate by a voice vote on July 6 killed the President's Reorganization Plan to transfer the Reconstruction Finance Corp., save for its housing finance program, to the Department of Commerce. The Plan would have vested in the Secretary of Commerce authority to make policy decisions now made in the RFC's Office of Rubber Reserve. This procedure would have included production planning and allocation of government synthetic rubbers and possibly a large share in determining whether and to whom to lease government synthetic rubber plants.

Industrial Mobilization Plans

President Truman asked Congress on July 19 for priority and allocation authority over industrial and other materials essential to war production. He asked also for authority to prevent hoarding of these materials, including powers to requisition hoarded materials.

Government rubber officials in Washington were unanimous in declaring that these requests, assuming Congress will grant them, "change nothing" as far as rubber is concerned.

Ample powers exist to do all these things in the Rubber Act of 1950 for both natural and synthetic rubber. The Selective Service Act of 1950, carrying a provision originally enacted in the closing rush of the 80th Congress, authorizes the President to invoke priority powers over any material essential to war production. This priority power is ample to procure styrene for synthetic rubber production. This law also permits the President to seize industrial plants and jail their directors should they refuse to take orders for war goods.

Thus far, there has been no indication that these powers will be used for rubber. RFC is covered for styrene necessary to reopen the Port Neches, Tex., copolymer plant. Opening of additional production facilities, should voluntary efforts to cover styrene requirements fail, might bring about use of controls.

The President did not ask authority to ration or control prices of consumer products. He said if prices get out of hand, he will not hesitate to ask them.

Meanwhile the Federal Supply Service of the General Services Administration continued to add to the strategic stockpile of natural rubber supervised by the Munitions Board of the Defense Department. Purchases were being made at a normal pace, although not on the New York Exchange where No. 1 RSS rubber hit 50¢ a pound in late July, it was reported.

Industrial Relations News

Wildcat strikes plagued the rubber industry, particularly in the Akron area during the latter part of June and throughout July. A dispute in the inspection department of the Mohawk Rubber Co., which began on June 24, idled 450 workers for several days. There was a short work stoppage at the Goodrich plant on June 24, and also at Goodyear and at Firestone between the twenty-fifth and thirtieth of June, but all of these disputes were settled before July 1.

On July 12, however, about 3,500 workers at the Goodrich plant were thrown out of work because of difficulty in the tire building department. Three tire builders had been producing considerably in excess of other workers, and the local URWA union had asked the company to impose some restriction on either the productive performance or the unit hour payments of these three men. The company refused to impose any such restriction and the other workers walked out.

On July 13 one of the three high production tire builders, James Helton, filed a charge of unfair labor practices against the Akron local URWA union #5, charging that representatives of the local union had threatened his personal safety for building more tires "than the limit fixed by the union." In addition, "the lack of production by other employes," the complaint stated further, "is due almost entirely to the fact that said employes hold down other full-time jobs as meat cutters, bricklayers, gas station attendants, telephone company operators, painters, etc."

The local union called the walkout unauthorized, but gave no explanation of its cause. The company said it would negotiate with the union whatever problem started the walkout whenever the union discloses the problem and the strikers returned to work. It then sent a telegram to the local union president, George R. Bass, calling the union responsible for the actions of its committeemen and representatives in initiating and maintaining the work stoppage.

"Furthermore," the telegram stated, "the lack of any effective action on your part to end this work stoppage is directly in conflict with our agreement of March 24, 1950, which provides that the union will within 30 hours after being informed of a work stoppage, take reasonable action to induce the employes to resume work in a normal manner."

Bass in his reply to the company said the union had met every obligation in trying to get the workers back on the job and that the local union's officers had gone beyond any contractual obligation in that effort.

The workers returned to their jobs on July 17, following a union meeting at which the condition was introduced that the dispute be processed immediately. Bass said a number of charges will be filed against the company in the regular labor-management grievance procedure, including complaints of discrimination, lockout, and violation of the company-union agreement. He insisted that the company restrict the workers to a 90-unit-hour production level of tires.

Earlier, in a letter to 800 tire builders in his department, P. W. Perdriau, superintendent of the tire division said, in part:

"We were requested prior to the stoppage to compel all tire builders to limit their unit hours performed to a maximum of 100. To do this would be contrary to accepted principles of incentive wage payment, contrary to practices in other departments in the plant, and contrary to practices of the tire division."

About 800 workers were idled for two days between July 12 and 14 at the Seiberling plant in Akron when a dispute in the mill room slowed down production of tires and tubes to about one-half the normal rate.

The URWA international policy committee scheduled a meeting in Columbus, O., July 24 and 25, to discuss how much of a wage increase to ask from the various rubber companies. Leaders of various local unions indicated that an increase of 20 to 25¢ an hour might be asked to enable workers to meet rising living costs. The committee may also consider a plan to correct wage inequalities in plants in Akron as well as outside Akron.

On July 16, L. S. Buckmaster, president of the URWA notified the Goodrich company that the union wants to reopen the wage question. The company has 30 days to reply and is expected to give its answer within that time. This is the first of the Big Four companies that has been faced with a request for wage increases since the settlement of the pension and insurance agreements last year.

In Canada a wildcat strike in the curing department at the plant of Goodyear Tire & Rubber Co. of Canada, Ltd., New Toronto, threw 1,500 employes on tire production out of work on July 10, but the wage dispute, which was the cause of the walkout, was settled two days later. Cause of the dispute, according to an official of the local URWA union, was a speed-up and transfer of a union steward from his regular day shift to the afternoon shift. The company stated that a piece rate set last October had caused discontent among the workers, but an adjustment with the union had been reached in February.

In Akron, also, a new three-year labor contract was signed between the Allied Chemical Workers, an independent union, and Columbia Chemical Division, Pittsburgh Plate Glass Co., in mid-July. Workers will get a 5¢-an-hour general wage increase immediately, 5¢ an hour more on June 28, 1951, and another 5¢ an hour on June 28, 1952.

In addition to the wage increase the company has granted three-week vacations for workers with 20 years' service, improved shift differentials, and increased group hospitalization benefits. A pension program providing for old age retirement and disability pensions has also been agreed upon.

In a joint statement Herbert O. Eby, director of labor relations for Pittsburgh Plate, and Cecil Wright, local union president, said:

"The new contract will mean more steady employment and will increase the possibilities for expanding employment due to any expanded operations that may be undertaken."

Among the products of Columbia Chemical are calcium and silica pigments used by the rubber industry.

The Bond Rubber Corp., 326 Derby Ave., Derby, Conn., at a recent board meeting elected Edward F. Kirik vice president in charge of sales. Mr. Kirik, who joined the company in 1948 as sales manager, has been associated with the rubber industry since 1945.

EAST

G-E Promotes Several

John L. Busey has been elected a vice president of General Electric Co., Schenectady, N. Y., and placed in charge of marketing policy, a newly created post. He formerly was president and a director of the General Electric Supply Corp.

Concurrently, William V. O'Brien, formerly general sales manager of G-E's apparatus department, has been elected a commercial vice president and appointed assistant manager of marketing policy for the company. Charles R. Pritchard, formerly manager of marketing for the appliance and merchandise department, has been elected president and a director of the G-E Supply Corp. Mr. Busey and Mr. O'Brien will establish headquarters in New York and Mr. Pritchard in Bridgeport.

In making these announcements, G-E president, Charles E. Wilson, said that the new marketing posts were created because their need has been emphasized by the sustained high level of the company's business volume, by the greater diversification of its products, and, in particular, by a steadily growing appreciation of the importance of marketing as a function of the company's business.

Howard L. Franks has been named manager of sales personnel and control in G-E's chemical department, Pittsfield, Mass. Mr. Franks was director of sales for Merrill Bros. for the past three years and previously had been with Charles Fischer Spring Co. as sales and advertising manager and with Carpenter Steel Co. in a number of sales executive capacities.

Willard R. Barrett, formerly vice president and general manager of the Hoosier Cardinal Corp., Evansville, Ind., has been named sales manager for the G-E plastics division. Mr. Barrett was with Hoosier, vendor manufacturer of decoratives, metals and plastics, for the past three years and prior to that had been with E. I. du Pont de Nemours & Co., Inc., 24 years.

James F. Somers, of the chemical department, has been named to the Detroit sales office on phenolic compounds and phenolic resins. Mr. Somers first came to G-E in 1943, to the phenolic compound manufacturing control laboratory. The following year he was assigned to the new product development laboratory; after two years he joined chemicals sales at Pittsfield. Then in January, 1949, he was given special field assignments in the Midwest and prior to his present appointment was headquartered at the Coshocton plant. Mr. Somers is a member of the American Chemical Society.

The chemical department has discontinued the fabrication of laminated plastics at the Coshocton, O., plant of its laminated and insulating products division. This operation, which produced fabricated parts for industry from G-E Textolite laminates, has been sold to General Laminated Products, Inc., which has plants in New York and Chicago.

General Electric will continue to produce Textolite laminates in the form of sheets, tubes, and rods at Coshocton. It will also continue to manufacture decorative laminated plastics surfacing materials and custom molded laminated products there.

R. B. Crean

Crean Baldwin Vice President

R. B. Crean, newly elected vice president in charge of apparatus sales at The Baldwin Locomotive Works, Eddystone, Pa., has inaugurated a reorganization policy to strengthen all phases of the promotion and sales of the company's products and to offer improved service to its customers in the railroad, materials testing, metal working, plastics, power generation, and marine fields. To further these objectives Mr. Crean has made several appointments and functional changes in the company's sales organization.

E. R. Wisner, who has had a number of important assignments since joining Baldwin in 1947, has been appointed manager, locomotive department, and will direct sales activities in connection with complete locomotives of all types.

E. F. Sheehan, formerly concerned only with the sales of diesel renewal parts, has been appointed manager, renewal parts department, and the scope of his activity has been broadened to cover the sale of renewal parts for both diesel and steam locomotives.

Andrew Liston will continue as manager, hydraulic turbine and marine products department, and in addition will have charge of the sales of all foundries products and the handling of negotiations with the United States Government on special products.

M. L. Hall, formerly manager, testing equipment sales, has been named manager, testing equipment department, with complete responsibility for the operation of this phase of Baldwin's activities.

George F. Walsh, sales promotion manager, testing equipment department, has been made sales promotion manager, and his activities will cover the promotion and advertising of all product groups.

R. G. Tabors continues as manager, hydraulic press and power tool department; and R. S. Oberlander, as manager, diesel engine department.

J. V. Breen has been named manager, order service section; and R. Zerewat, manager, market research and statistics.

J. O. Ross Engineering Corp. on August 1 moved its New York, N. Y., office from 350 Madison Ave. to larger quarters at 444 Madison Ave.

50 Years for Firestone

Dedication of an impressive memorial to the late Harvey S. Firestone highlights the celebration of the fiftieth anniversary of the founding of The Firestone Tire & Rubber Co., Akron, O. The ceremonies of dedication take place on August 3, upon which day the company was founded by Mr. Firestone in 1900.

A comprehensive exposition of Firestone's half century of research, technical, and production progress will be opened to employes and the public in the Firestone research building as part of the anniversary celebration. It will portray dramatically the progress made by the Firestone company from its original inception as a local enterprise to its present eminent position in the rubber industry.

Featured in the exhibit will be a collection of products first made possible by Firestone, including the first mechanically fastened straight-side tire, forerunner of the type now in universal use; the first commercial demountable rim which has now become the demountable wheel; the first rubber non-skid tread, now a safety feature of all pneumatic tires; the first practical pneumatic tractor tire which led to putting the farm on rubber; and the first balloon or low-pressure tire which has now been developed into the present-day super-balloon.

Inside the main exhibition hall the display ranges from early carriage tires to 44-ply earthmover tires nine feet in diameter. Diversity of present-day production as well as its development during the past 50 years will be indicated by displays of hundreds of steel, plastic, and mechanical rubber products.

From the Edison Institute Museum at Detroit has come a series of machines depicting the evolution of tire building, including the first drum-type tire building machine.

Of particular interest to workers and their families will be a display of employe welfare and safety photos covering a period of many years. Samples of Firestone advertising from the early 1900's to the present day will be shown, providing an unusual history of merchandising methods since the beginning of the automobile.

On the last two days of the anniversary week, August 4 and 5, the men and women of Firestone and their families will be guests of the company at four special performances of Ringling Brothers & Barnum & Bailey Circus. The company has purchased all seats for these two days and will distribute 37,000 tickets to employes and their families.

As the circus appears in other cities in which the company has subsidiary plants, employes and their families will be guests. These include Pottstown, Pa.; Fall River, Mass.; Wyandotte, Mich.; Memphis, Tenn.; Gastonia, N. C.; Bennettsville, S. C.; Noblesville and New Castle, Ind.; and Des Moines, Iowa.

Mitchell Western Division Manager

J. E. Mitchell, since 1943 Milwaukee district manager for Firestone was made western division manager in charge of original equipment sales and will direct manufacturers sales activities in the Chicago, Milwaukee, and Midwest territories, with headquarters in Chicago. Mr. Mitchell, who has been with the company two decades, had previously served it as a territory salesman in the Kansas City district, as a special farm tractor tire representative in Akron, and as district manager at Wichita.

R. E. Smith

R. B. Sucher

R. P. Painter

M. E. Jones

Jones Advanced by Koppers

Irvin H. Jones, since 1944 manager of the patent section, research department, Koppers Co., Inc., Pittsburgh, Pa., is now international development manager for Koppers. In the new position Mr. Jones will be responsible for the development of management-type contracts and the participation of Koppers in foreign business ventures with foreign nationals in the chemical, tar products, wood preserving, coke and metal products fields.

Foreign industrial design, engineering, and construction contracts and work still will be handled by the company's engineering and construction division. Vice President W. C. Rueckel, who has assisted in setting up the international development program of the company since formation of an international sales section last February, returns to his position as manager of export sales for the engineering and construction division.

W. J. Monacelli, assistant manager of the patent section, research department, has been named acting manager of that section.

Mr. Jones was a chemist for ten years with Koppers, spent four years as a research fellow at the Mellon Institute of Industrial Research, was an observer for Koppers Construction in Germany for two years, and headed the research department's patent section the last six years.

Dr. Monacelli joined Koppers research department in 1947 as a patent attorney after serving as a research chemist for three nationally known industrial firms and in the patent section of a fourth.

For More Titanium Pigments

National Lead Co., 111 Broadway, New York 6, N. Y., will begin construction immediately of new facilities for production of titanium pigments. The additional capacity, expected to increase the present rate by 60,000 to 70,000 tons annually, will be added first at the company's St. Louis plant. Depending on delivery of the necessary equipment, first production will be realized from the new facilities within a year and full production within 18 months.

This new expansion follows closely upon postwar titanium pigment plant expansion by National Lead and is in step with the substantial increase in the use of titanium pigments. With additional capacity for producing both "Titanox-A" and "Titanox-C," the oxide and calcium types of pigment, National Lead expects to be able to satisfy the steadily increasing requirements of its customers.

Marbon Expands Sales Force To Handle Ty-Ply Adhesives

Marbon Corp., 1926 W. Tenth Ave., Gary, Ind., has announced that effective September 8 it will handle directly the sales and technical service activities on its line of Ty-Ply adhesives, used for bonding rubber to metal. This change is being made because the company's activities in other lines have required expansion of its sales force to the point where consolidation is justified. Sales and technical service on Ty-Ply adhesives will be handled by R. P. Painter, R. E. Smith, M. E. Jones, and R. B. Sucher.

Mr. Painter will maintain headquarters at 20 Pleasant St., Natick, Mass., and will cover the New England states. A graduate of Ashland College, Mr. Painter has been associated with the Mansfield Tire & Rubber Co., the Philadelphia Navy Yard, the Norwalk Tire & Rubber Co., and more recently with the Beebe Rubber Co. as production manager and chief chemist.

Mr. Smith will have offices at 4 Bruce Lane, Ewing Township, Trenton, N. J., and will cover New York, New Jersey, and adjoining areas. He has been laboratory supervisor for Canadian Synthetic Rubber, Ltd., chief rubber chemist for Witco Chemical Co., and research engineer for Plaskon Division, Libby-Owens-Ford Glass Co.

Mr. Jones will work out of the home office in Gary, and cover the midwest and southern areas. He has been with Marbon for the past five years; all but the first year was spent in technical sales and service.

Mr. Sucher will cover Ohio and adjoining areas, with headquarters in Akron. He was with Inland Mfg. Division, General Motors Corp., for the past seven years and previously had been with Ohio Oil Co. and Cooper Tire Corp.

Sales Agent for Krynac

H. Muehlstein & Co., Inc., 60 E. 42nd St., New York 17, N. Y., is exclusive sales agent in this country for Polysar Krynac, the new low-temperature nitrile rubber developed by Polymer Corp., Sarnia, Ont., Canada. The new rubber is said to show improved extrusion and aging properties over similar nitrile rubbers polymerized at normal reaction temperatures. Other features of Krynac include easy processing, high tensile strength, and resistance to oils and greases, aging, flexing, and abrasion. Samples and technical data on the rubber are available from Muehlstein upon request.

Russell Buys Grip-Tex

Russell Mfg. Co., Inc., Middletown, Conn., has announced the purchase early in July of the physical assets of the Grip-Tex Mfg. Co., Fall River, Mass. According to George M. Williams, president of Russell, the wide and narrow elastic divisions of the company were operating at a disadvantage a year ago. The company had a good line of wide elastic fabrics, but almost no narrow elastics. In addition, manufacturing facilities were inadequate and scattered. The company has now concentrated its wide elastic manufacturing in two buildings at the main Middletown plant and has established a new plant in West Columbia, S. C., for the production of narrow elastic webbing. On February 16, Russell purchased four new rubber covering machines; in May, 1949, bought 28 wide elastic looms; and last March purchased 14 more wide elastic looms. With the acquisition of Grip-Tex, Russell will receive 11 rubber covering machines and 11 Universal winders. Much of this equipment will be installed at Middletown, and the balance shipped to West Columbia.

"By these purchases of new and improved equipment we expect to make a better product for less money, and increase this important part of our business," Mr. Williams stated.

Calco Notes

American Cyanamid Co., Calco Chemical Division, Bound Brook, N. J., last month appointed H. R. McCleary sectional director, application research department, to assist on special assignments covering all activities of the physical chemical research section. Dr. McCleary has been identified for several years with the study of physical chemical properties of dyes and dyeing and the application of physical chemical techniques to Calco research, development, and manufacturing problems, having joined the Calco physical chemical research staff in 1941.

The ad series, "Calco Dyelines," running currently in trade publications to the textile industries, recently received the Premier Award for Business Paper Campaign, Product Advertising in Industrial Publications. The entry was submitted by Calco's agency, Hazard Advertising Co., in the Annual Creative Awards Competition of the National Advertising Agency Network. The award was presented at the nineteenth annual conference of this association, held at the Seigniory Club, Montebello, P.Q., Canada.

U. S. Rubber Changes

Clayton F. Ruebensaal has been appointed technical director of plastics and resins for Naugatuck Chemical division, United States Rubber Co., Rockefeller Center, New York 20, N. Y.

Mr. Ruebensaal will assume direction of all research, process development, and technical service activities pertaining to Kralastic molding powders, Vibrin polyester resins, Marvinol vinyl resins, and PQL resins for enamels. He will make his headquarters at the division's main plant in Naugatuck, Conn.

He was one of the organizers of the chemical division of the Glenn L. Martin Co., Baltimore, Md., and was in large part responsible for the initial research, development, and production of the Marvinol polyvinyl chloride resins. He joined U. S. Rubber late in 1949 when the company purchased the assets of Martin's chemical division.

Mr. Ruebensaal is a member of the American Chemical Society, American Institute of Chemical Engineers, Society of the Plastics Industry, Society of Plastics Engineers, and Alpha Chi Sigma. In 1945 and 1946 he was one of a group of technical consultants who visited Germany at the invitation of the United States Government to study German methods of plastics production and research. He holds numerous U. S. and foreign patents pertaining to plastics and electro-chemical developments.

Nils Walter Swenson, manager of mechanical goods sales for the Buffalo, N. Y., branch, has been appointed assistant manager of branch sales for the mechanical goods division, with headquarters at the company's offices in Rockefeller Center.

Thomas H. Young, director of sales for U. S. Rubber and coordinator of the savings bond campaign for the Advertising Council, received the Distinguished Service Award of the United States Treasury at a special testimonial luncheon on June 27 at the Waldorf-Astoria Hotel, New York.

Pach Bros.

C. F. Ruebensaal

Rubber Fender, Developed by U. S. Rubber, Being Mounted over Street Car Wheel

Recent Developments Announced

A new premium-quality low-pressure tire, the Fisk Safti-Flight, has been announced by the Fisk Tire Division of U. S. Rubber. According to General Sales Manager Howard N. Hawkes, the new tire is designed to withstand the extreme demands of present-day traffic conditions and is the safest tire ever built. The tread design includes multiple safety slotting for quicker stopping and better control. A defender scuff guard protects the white sidewalls from blows and blackening caused by curbs or ruts. The new tire also features a deeper tread and a compact footprint that gives more rubber on the road.

Development of a rubber fender for street cars which outwears metal and has eliminated fender maintenance costs for the Detroit Street Railway Department has been announced by U. S. Rubber. Trial tests have been so successful that rubber fenders have been specified on 106 new cars purchased by the Department, and rubber fenders are replacing steel fenders on all cars now in service. The fenders are constructed of neoprene with a fabric interlayer, and the undersurfaces have a ribbed design for added strength. The fenders are mounted over the wheels of each truck to protect electrical equipment from splashing mud, oil, grease, and water. The rubber fenders operate quietly, do not rust or corrode, need no periodic tightening, and have required no servicing or replacement during the past 12 months, it is further claimed.

A bathroom mirror that will not fog has been developed by the Charles Parker Co., Meriden, Conn., utilizing a heater made of electrically conductive rubber designed by U. S. Rubber. The rubber heater is mounted behind the mirror and warms the glass to a temperature of 98° F., enough to offset the condensation of moisture-laden steam. It operates on 110 volts, using about the same amount of current as a 60-watt bulb and is controlled by a switch mounted in a corner of the mirror. The mirror is mounted in a wall-type medicine cabinet which also contains built-in fluorescent lights. The Parker company is also experimenting with the manufacture of an electric mirror for use in golf clubs, hotels, and public washrooms.

The shine on men's suits caused by repeated pressing can be reduced by use of a new dry cleaning press cover fabric made largely of asbestos blended with cotton and nylon. Called Asbestall, the fabric was developed by U. S. Rubber's textile division to meet dry cleaners' needs of a long-lasting cover that would keep garments from slipping while being pressed. Because of the heat retaining qualities of asbestos, the fabric offers a superior finishing surface which results in quick drying and a better finish for the pressed garments, it is further claimed. Flow of steam through the cover is freer and faster, thus reducing shine on clothing. Asbestall is distributed by Gustin-Kramer Co., Boston, Mass., who fabricate it into pressing machine covers.

Scrap Rubber Freight Rates Cut

The proposal to lower freight rates for scrap rubber in carload lots, made by the Scrap Rubber Institute of the National Association of Waste Material Dealers, was approved by the general freight committee, Eastern Railroads, at a meeting in Chicago, Ill., on June 12. The effective date for the new rates has not been revealed as yet, but was expected to be 30-40 days after the date of the committee's decision.

The proposed reduction is believed to be about 15% for carload quantities, with a minimum weight of 40,000 pounds for cars up to 40 feet and seven inches long, and 45,000 pounds for cars greater in length. The proposal was prepared by the Institute's traffic committee, with L. N. Larsen, H. Muehlstein & Co., as chairman, and including Roger Ottignon, Nat E. Berzen, Inc; C. S. Geiger, A. Schulman, Inc.; and E. W. Kneesy, also of H. Muehlstein. The presentation before the railroad committee was made by Messrs. Kneesy and Geiger.

A delay of 90-120 days before the above recommended freight rate reduction for scrap rubber becomes effective may occur while concurrences are being obtained from the different freight associations, Mr. Larsen announced later, early in July. He also pointed out that the award of "column 19" rates for scrap rubber within official territory was made by the Eastern Railroads' general freight committee. The area covered by this group also included extended zone "C" in Wisconsin and the Western Trunk Line Northwest Territory. The old rate will prevail until concurrences are received from the other freight associations.

Huber to Build New HAF Plant

J. M. Huber Corp., 342 Madison Ave., New York 17, N. Y., will erect a new furnace carbon black plant near Baytown, on the Gulf Coast of Texas. It is expected that the plant will be completed by March 1, 1951, and will cost $1,500,000. Its annual capacity will be 30,000,000 pounds of HAF-type carbon black, the raw material for which is oil.

The company's present carbon black operations are at Borger, Tex., where it operates one of the largest channel carbon black plants in the world and also produces furnace blacks. The company is also an independent producer of oil and gas, owning and operating some 400 wells in Texas, Kansas, Wyoming, and Colorado. Its drilling program for 1950 includes more than 100 wells.

J. M. Huber Corp., in addition, operates kaolin clay mines and plants in Georgia and South Carolina, whose products are used in the rubber and paper industries, and also produces other rubber chemicals. The company is a large producer of printing ink with plants in Brooklyn, N. Y.; Bayonne, N. J.; McCook, Ill.; and Borger, Tex.

For Small Plasticizer Bills

COMPATIBLE WITH MOST COMPOUNDS

WON'T MIGRATE FROM FINISHED PRODUCT

EXTENDS OTHER PLASTICIZERS

S/V SOVALOID C gives you all these processing benefits at extremely low cost

You can't beat this inexpensive plasticizer for Vinyl resins and Buna N. It costs but a fraction of conventional ester-type plasticizers — yet offers many processing advantages.

S/V *Sovaloid C* is completely compatible with all Vinyl and Buna N compounds. It imparts flexibility . . . provides unusual oil-resistant qualities . . . adds greater tensile strength . . . won't bleed from the finished product. It also can be used as an extender of more costly plasticizers.

Get all the facts about S/V *Sovaloid C* from your Socony-Vacuum Representative.

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Seyb Succeeds Underwood

L. P. Seyb, since 1942 a chemist and group leader in the research department of Diamond Alkali Co., 300 Union Commerce Bldg., Cleveland 15, O., has been named manager of research. He succeeds J. E. Underwood, who relinquishes the post he has held for the past six years to become a research consultant for the company.

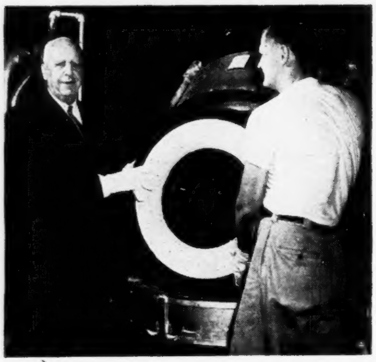
Dr. Seyb first came to Diamond from the Phillips Petroleum Co., where he had been a chemistry assistant in the patent department for three years. His research work with Diamond as a group leader has included product development projects involving fatty acids, wetting agents, textile bleaching and flameproofing materials, ethylene derivatives, chloro hydrocarbons, and inorganic silicates.

Author of many technical papers, Dr. Seyb also is a member of many professional organizations, including the American Chemical Society, Alpha Chi Sigma, Phi Lambda Upsilon, and Sigma Xi.

Mr. Underwood enters the consulting field with a distinguished record in chemistry and physics compiled over a number of years. Prior to joining Diamond six years ago he had been manager of research and development for the Pennsylvania Salt Mfg. Co. for 16 years. From 1923 to 1927, Mr. Underwood was director of research for the National Lime Association, Washington, D. C. His extensive industrial research experience, which began in 1915 with a fellowship at Mellon Institute in Pittsburgh on a problem sponsored by the Hope Natural Gas Co., also includes service respectively with the United States Bureau of Mines in Colorado, the Radium Co. of Colorado, and the Radium Emanation Corp. at Pittsburgh.

Mr. Underwood is affiliated with a number of professional organizations including American Association for the Advancement of Science, American Chemical Society, American Institute of Chemical Engineers, Society of Chemical Industries of Great Britain, London Chemical Society, and the Rittenhouse Astronomical Society.

United Engineering & Foundry Co., Pittsburgh, Pa., through Board Chairman F. C. Biggert, Jr., issued a statement to its stockholders and employes concerning the civil suit filed against the company by the United States Department of Justice which accuses the firm of violating the Sherman Anti-Trust Act. The statement notes that the company has from time to time during the past 13 years entered into contracts with different firms in foreign countries. Under these contracts United furnishes designs and technical assistance, and the foreign company acts as sales agent in an allotted territory. These contracts were made with the approval of legal counsel. Some months ago, after conferences with the Department of Justice, the company inferred that the Department considered these territorial restrictions objectionable and accordingly revised the contracts to eliminate these restrictions. The statement emphasizes that United did not and does not consider the territorial restrictions illegal and greatly resents the Justice Department's accusation of conspiracy and veiled insinuation that the company attempted to crawl out from under an illegal act.



P. W. Litchfield Observes Fiftieth Anniversary with Goodyear by Supervising Production of Company's 500,000,000th Pneumatic Tire

Goodyear News

Karl J. Learey, district manager at Atlanta, Ga., for the general products division of The Goodyear Tire & Rubber Co., Akron, O., has been named manager of Airfoam sales with headquarters in Akron. This appointment follows the recent resignation of R. C. Hogan. Mr. Learey will report to R. E. Pauley, manager of the Airfoam department. Mr Learey joined Goodyear's Airfoam sales organization in 1948 and was assigned to the Chicago district. In February, 1950, he was sent to Atlanta to represent the company as district manager for Airfoam, Pliofilm, Vinylfilm, and flooring sales.

P. W. Litchfield, Goodyear board chairman, observed his fiftieth anniversary with the company on July 14 by supervising the final production steps in the manufacture of the 500,000,000th pneumatic motor vehicle tire built by Goodyear. Other company executives joined Mr. Litchfield in observing the completion of the tire, a 7.60-15 passenger-car size. As the symbolic unit was lifted from the mold by the operator, it was presented to Mr. Litchfield, who in 1901 directed the development and building of the firm's first pneumatic automobile tire. Mr. Litchfield was made a member of the Akron Fifty-Year Club and received his 50-year Goodyear service pin from L. B. Williams, a company director, during a tableaux in the Goodyear theater depicting the highlights of his half-century with the firm.

Financial World, 86 Trinity Place, New York 6, N. Y., from almost 5,000 corporations' annual reports for 1949, submitted in the tenth annual survey conducted by the weekly, selected 14 rubber and tire companies for its "Highest Merit Award" citations in their field, as follows: American Hard Rubber Co., Armstrong Rubber Co., Baldwin Rubber Co., Brown Rubber Co., Dayton Rubber Co., Dunlop Rubber, Ltd., Firestone Tire & Rubber Co., General Tire & Rubber Co., The B. F. Goodrich Co., Goodyear Tire & Rubber Co., Hewitt Robins, Inc., Seiberling Rubber Co., The Thermoid Co., and Thiokol Corp. The stockholder reports of these companies thus become candidates for the final judging, and one will be selected for a "Best of Industry" award and presented with a bronze "Oscar of Industry" at the *Financial World* annual report awards banquet on October 30 at the Statler Hotel, New York.

Goodrich Chemical Products

No-Nib'l, a new rabbit repellent for gardeners that is said to reduce greatly the amount of damage to agricultural crops, flowers, and vegetables, has been introduced commercially by B. F. Goodrich Chemical Co., 324 Rose Bldg., Cleveland 15, O. Packaged in powder form, the new product can be dusted on plants and flowers or can be mixed with water and used as a spray. In tests at the University of Florida Agricultural Experiment Station, the repellent proved highly effective in discouraging rabbits from eating corn, flowers, and young vegetable crops. Distribution of the repellent will be established this year in a test market area in Ohio, Indiana, and Western Pennsylvania, with nation-wide distribution planned for 1951.

A new mechanical shaft seal assembly, introduced by Marlow Pumps, Inc., Ridgewood, N. J., on its self-priming centrifugal pumps, has as one of its components a rotating seal collar made from Goodrich Chemical's Hycar rubber. The new "SF" shaft seal is furnished in either self-lubricating or grease lubricated models. The former is used with clear liquids, and the latter with fluids containing abrasive solids. Both assemblies have the same principal elements: a stationary carbon seal ring; stationary Hycar seal ring gaskets; rotating Meehanite seal ring; and Hycar seal collar.

Vinyl welting made from Goodrich Chemical's Geon plastic is being used as a gimp or binding in nylon, rayon, and fiber automobile seat covers manufactured by Glostex Products, Inc., Chicago, Ill. The welting, extruded by Auburn Button Works, Inc., combines both bead and leg which in conventional bindings are made from at least two different materials, such as coated fabric, cloth, paper, etc. Supplied in a range of colors which are claimed not to fade in sunlight or over long periods of time, the welting has better abrasion resistance than commonly used coated fabric binding and also has great seam strength. The welting is also said to be resistant to dry cleaning solvents, to have good flexibility at high and low temperatures, and it can be easily handled and stitched into seat-cover materials on conventional sewing machines.

Geon vinyl plastic, made by Goodrich Chemical, is used in a new insulating compound designed for high temperature service (105° C. maximum) that protects iron and copper constantan thermocouple lead wires manufactured by Thermo Electric Co., Inc., Fairlawn, N. J. The new insulation withstands oils and most chemicals at higher temperatures for longer periods than rubber, it is reported, and is used by Thermo Electric on 10-to-24-gage lead wires for a variety of pyrometric temperature measuring applications. Features claimed for the compound, Geon Plastic 8630, which make it satisfactory for this application, include excellent resistance to high temperature aging; good abrasion and deformation resistance; good flexibility at both high and low temperatures; smooth, glossy surface; high dielectric strength; very good outdoor weathering characteristics; non-corrosiveness toward copper; and no effect on painted or varnished surfaces.

Vinyl tubing made from Geon resin, a product of Goodrich Chemical, has replaced rubber latex tubing in Abbott Laboratories' Venopak unit for intravenous feeding and injections. The unit contains dispensing cap, air filter, drip tube, adapter, and extruded

translucent plastic tubing. Development of the vinyl tubing came as an outgrowth of certain problems attending the use of latex tubing, including high cost and necessity of cleaning and resterilization for reuse. Abbott Laboratories has also developed a special method for sterilizing the vinyl tubing which prevents the tubing from collapsing or sticking to itself.

The Rubber Trade Association of New York, Inc., 15 William St., New York 5, N. Y., has accepted the resignation, because of ill health, of its secretary, B. G. Davy, who had been with the organization some 30 years. His successor is Arthur J. Garry, of the Association, who was formerly with Rubber Reserve Co., Rubber Distribution Corp., Reconstruction Finance Corp., and other rubber interests since 1941.

Vansul & Co., Englewood, N. J., has initiated an extensive development program toward producing color dispersions and masterbatches for vinyl plastics and expects soon to go into production on forms of dispersed color along the same lines as the Vansul Master Batches used by the rubber trade for the past 25 years. Herbert H. Watjen, who has wide experience in this field, has been named technical director to head this program.

Carbon Black Export, Inc., has moved its offices to Room 250, 420 Lexington Ave., New York 17, N. Y.

Department of Defense, Washington, D. C., recently reported the awarding of the following contracts: 97,878 rolls of adhesive tape, value, $102,669.49, to Sanette Mfg. Co., Inc., New Rochelle, N. Y.; 124,995 single, steel clothes lockers, $1,140,452.22, Goodyear Aircraft Corp., Akron, O.; auto spare parts, $216,560, United States Rubber Co., Detroit, Mich.; cable connectors, terminals, and cable marks, $50,000, Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y.; cable, $50,000, Okonite-Callender Cable Co., Washington, 3,399,351 feet, $2,206,808.26, General Cable Corp., Perth Amboy, N. J., 600,000 feet, $370,575, Ansonia Electrical Co., Ansonia, Conn.; aircraft hose, $109,077, U. S. Rubber, New York, N. Y.; 220 inflatable lifeboats, $136,155.80, Willis & Geiger, Inc., New York; auto spare parts, Timken Roller Bearing Co., Canton, O., $130,680.

News from Goodrich

L. J. Brady has been named manager of the St. Louis district of the replacement tire sales division. Brady served in the St. Louis area 20 years previous to being transferred to the Omaha district as general supervisor in May, 1948. He first went to St. Louis as traveling auditor in 1928. He had joined The B. F. Goodrich Co., Akron, O., the year previously and had served as district operating manager and as store supervisor.

John R. Watkins has been named operating manager of the International B. F. Goodrich Co. He joined Goodrich in 1946.

Rubberized Dark Room

A portable photographic dark room and briefing tent that is 80 feet long, but uses columns of air for its structural members has been developed by Goodrich for the Air Force. The rubberized room can be carried in the smallest military transport plane, inflated in six minutes, and deflated in 25 minutes. The tent weighs only 740 pounds and is as large as a four-room house. Nine U-shaped structural columns made of neoprene-coated fiberglas-nylon fabric are inflated with three pounds of air to hold the covers in place. The dark room is fabricated in eight sections fastened together with 320 feet of zippers. It can be erected with any number of sections, thus making it adaptable to a multitude of uses. The briefing room can accommodate 100 men and has a special screen for the projection of three-dimensional pictures. The tent measures 80 feet long, 21 feet wide, and 16 feet high; can be packed in eight duffel bags when deflated and disassembled; and comes complete with a repair kit for patching accidental rips or tears in the fabric.

Radioactive Golf Ball

An "atomic" golf ball that cannot be lost has been developed at the Goodrich research center, Brecksville, O. Minute quantities of radioactive materials embedded under the cover of the ball make it possible for a caddy carrying a small, portable Geiger counter to locate the golf ball even when it is hidden in dense woods or deep rough. According to W. L. Davidson, director of physical research at the research center, the location of the lost ball is shown by the counter by either a flashing light on the instrument or by signals which the caddy can hear through head phones. Dr. Davidson said that the project is experimental, and that no sale

Radioactive Golf Ball Developed by Goodrich Research Center Can Be Located with Geiger Counter. Golf Pro Jimmy Thomson Tests Counter as Lawson Little *(Left)* Watches in Demonstration at Akron

of radioactive golf balls is contemplated at the present time. He also stated that the amount of radioactive material inside each ball is too small for any danger of radiation. At a demonstration at the Portage Country Club, Akron, golf pros Jimmy Thomson, Lawson Little, and Denny Shute drove radioactive balls into a wooded area, and the balls were located by the caddy with the aid of the Geiger counter.

Tire Developments

A new Defiance tire was announced by Goodrich and offered to the public in a July introductory sale. The tire has a wide and flat tread, with buttress built shoulders, and the tread has a center "safety zone," seven full ribs, and zig-zag anti-skid blocks. The company's "Rythmic Floating Cords" are used in its construction.

A new off-the-road tire in its Universal line has been developed by Goodrich for use on front wheels where easier steering is desired. The ribbed tread has been specially engineered for this purpose, and construction of the tire is the same as the conventional Universal. The tire is available in three popular sizes: 12.00-24, 16-ply; 13.00-24, 18-ply; and 14.00-24, 20-ply.

An airplane "tire" that meets rigid traction requirements, yet never touches the ground has been developed by Goodrich engineers. Named pallet rollers, the six-inch tires are used inside the new Douglas C-124 Globemaster II to serve as driving wheels for two electrically operated elevator hoists. The elevators, each of which use four pallet rollers, add speed to cargo handling and can be used to load and unload at the same time. Although small in size and used in a comparatively simple operation, the pallet rollers presented difficult design and rubber compound problems. The rollers must provide good traction under all types of service conditions. The rubber compound must withstand temperatures ranging from —60 to +140° F. without shrinking from the traction surface. The roller must also withstand high preloads without permanent set, in order that traction be adequate when operating on inclines of as much as 6%.

Rubberized Photographic Dark Room and Briefing Tent Developed by Goodrich

NEWS ABOUT PEOPLE

Charles S. Johnson *(Right)* and His Successor, Paul E. Burchfield, as Director of Technical Service at Wyandotte Chemicals

Burchfield Promoted

Paul E. Burchfield has been appointed director of technical service, Wyandotte Chemicals Corp., Michigan Alkali Division, Wyandotte, Mich., to succeed Charles S. Johnson, director of technical service since 1939, who is retiring from active service, but will serve Wyandotte Chemicals in an advisory capacity.

After completing his formal education Dr. Burchfield joined Harshaw Chemical Co. in 1934 as a research chemist; his activities included work with paint, varnish, plastics, textile, and leather. In 1938, Dr. Burchfield signed with United Gas Improvement Co. as a research chemical engineer, specializing in plastics and rubber. He came to Wyandotte Chemicals in 1943 and spent three years as assistant supervisor in the chemical engineering department, research division. Dr. Burchfield was appointed assistant director of technical service department in 1946. Since then he has established himself in all the industries served by Wyandotte.

Dr. Burchfield has authored several articles on such chemicals as styrene, indene, halomethyl ethers, and chlorobenzenes. He is an active member of American Chemical Society, American Institute of Chemical Engineers, American Association of the Pulp & Paper Industry, and the Commercial Chemical Development Association.

Mr. Johnson has been affiliated with Wyandotte most of his life. While attending the University of Michigan, he worked every other year at Wyandotte Chemicals. After graduation in 1911, he was promoted to the company's main laboratory to work on special assignments.

R. H. Juve has joined Ferro Chemical Corp., Bedford, O., as technical sales representative. Mr. Juve obtained his wide experience in rubber and plastics with Goodyear Tire & Rubber Co., American Texolite Co., and Pennsylvania Rubber Co.

Allen H. Ottman, vice president and controller of the American Hard Rubber Co., 11 Mercer St., New York 12, N. Y., has been elected first vice president of the New York Chapter of the National Association of Cost Accountants.

Black & Stoller, 1937

F. S. Malm

Frank S. Malm, research chemist with the Bell Telephone Laboratories and well known and popular in the rubber industry, retired July 1 upon reaching his sixty-fifth birthday and after more than 44 years with the company. Upon his retirement Mr. Malm was honored guest at a series of luncheons and dinners given by officials of Bell Labs and various groups of suppliers who had been in contact over the years with Mr. Malm, who was also the recipient of many fine gifts.

His plans for the future include acting as liaison officer in the United States for Submarine Cables, Ltd., London, England, and supervising an exhibit by that company at the United States International Trade Fair being held in Chicago, Ill., August 7-20; this exhibit marks the centenary of the first submarine telegraph cable, laid August 28, 1850. Mr. Malm, who is a recognized authority on insulated cables, also plans to act as consultant for other companies in that field.

Alvin E. Hewitt, assistant general manager of Arrowhead Rubber Co., division of National Motor Bearing Co., Inc., Los Angeles, Calif., has been elected a vice president and a director of the company. Prior to the war he was Pacific Coast manager of the National Association of Manufacturers. After release from the Air Corps with the rank of colonel he became executive vice president of the California Association of Manufacturers.

Robert Vignolo, recently appointed Pacific Coast sales manager for Baker Castor Oil Co., will be responsible for the sale of all Baker products on the West Coast. His offices will be at the Baker plant, 5585 E. 61st St., Los Angeles 22, Calif. Mr. Vignolo was formerly sales manager and a director of the California Flaxseed Products Co. During the war he aided in the development of polyesters in addition to performing his regular sales duties. On leaving California Flaxseed in 1944, Mr. Vignolo joined Turco Products as assistant to the president and technical director.

Robert H. Crossley has been appointed assistant manager of zinc oxide sales, St. Joseph Lead Co., with headquarters at the executive offices, 250 Park Ave., New York 17, N. Y. Mr. Crossley joined St. Joe in 1948 as manager of technical service, zinc oxide department, after 14 years in rubber technology and sales and technical service of pigments and raw materials to the rubber, paint, ceramic, and related industries. In addition to his new duties, he will continue to have charge of technical service on zinc oxide. A graduate in chemical engineering, Ohio State University, Mr. Crossley is a member of the American Chemical Society and its Divisions of Rubber Chemistry, Industrial and Engineering Chemistry, and Paint, Varnish and Plastics Chemistry, the Akron and New York Rubber groups, and of the American Society for Testing Materials, serving on committees D-1 and D-11.

James A. Smith has been made sales representative in north-central Ohio for General Tire, with his headquarters in Mansfield. Smith has been a General Tire employe for 4½ years, working in the billing and timekeeping departments in the Akron office. He replaces Harvey Bailey, who resigned to become the General Tire distributer in Mansfield.

CANADA

Polymer Adding to Facilities

Polymer Corp., Crown owned manufacturer of synthetic rubber, and Imperial Oil, Ltd., have acquired considerable property adjacent to present sites for expansion of present production facilities within the next 18 months, it was learned at Sarnia, Ont., on July 8.

The expansion is said to be tied directly with the completion of the Interprovincial Pipe Line from Edmonton to Superior, Wis., and the Susquehanna pipe line from south of Toledo to Broomfield, both in Ont.

It is estimated that expansion of "chemical valley" within the next 18 months, if plans proceed according to schedule, will total close to $80,000,000. Besides the Polymer and Imperial projects, Sun Oil and Canadian Oil companies are reported each building a refinery estimated at about $20,000,000.

Imperial now supplies light ends of liquid gas direct to Polymer; while Sun supplies the same commodity by tank car. With its new refinery, however, Sun will market the raw material direct.

Polymer for some time has been unable to meet its export and domestic trade requirements owing to shortages of raw materials and manufacturing space.

Company officials are awaiting arrival from Europe of one of its top-flight engineers, who has been abroad some time studying methods and markets. His report will have much to do with the firm's expansion plans.

Annual Report to House of Commons

According to the annual report recently submitted to the Canadian House of Commons, Polymer Corp. in the fiscal year ended March 31, 1950, marketed 108,386,000 pounds of synthetic rubber from

its Sarnia plant. Sales were valued at $26,009,000, including those of other chemical products. Net profit was reported as $843,659.

The report also revealed that demand for almost all the company's products had increased well beyond productive capacity. But this condition was expected to be temporary since United States synthetic rubber plants were increasing their capacity. But barring a sudden and substantial drop in demand, the corporation said, no difficulty was expected in marketing the entire output of the plant, at least until the end of 1950.

E. R. Rowzee Named to the Board

E. R. Rowzee recently was elected a director of Polymer Corp., to succeed D. W. Ambridge, resigned. The new director came to Canada in 1942 on loan from the Goodyear Tire & Rubber Co., Akron, O., to act as manager of one of Polymer's operating companies, Canadian Synthetic Rubber, Ltd. In 1944, Mr. Rowzee severed his connection with Goodyear to become director of research for Polymer Corp. Three years ago he was made its manager.

The Sponge Rubber Products Co., Shelton, Conn., according to President F. M. Daley, plans to erect a modern factory of 30,000 square feet in which to manufacture chemically blown sponge rubber at Waterville, P.Q., Canada. This operation will in no way affect the business that the firm is doing in the United States.

OBITUARY

Douglas E. Stanley

ON JULY 16 in a Newark, N. J., hospital died Douglas E. Stanley, secretary-treasurer and purchasing agent of Magnolia Metal Co., 18 W. Jersey St., Elizabeth 4, N. J. He had been with the firm for the past 13 years.

Mr. Douglas was born in Newark on August 21, 1910. He was a graduate of Middletown Township High School (June, 1928), vice president of the Highlands (N. J.) Lions Club, and a member of the Highlands Planning Board.

Requiem Mass was sung on July 19 at Our Lady of Perpetual Help Church in Highlands, followed by burial in Mt. Olivet Cemetery, Middletown, N. J.

The deceased is survived by his wife, his mother, and a brother.

Russell B. Koontz

RUSSELL B. KOONTZ, former president and general manager of Adamson United Co., Akron, O., died June 23 in St. Petersburg, Fla., as the result of a heart condition from which he had been suffering several years.

He was born near Greensburg, O., in 1873. He attended Buchtel and Ada colleges, from which he received a master of engineering degree in 1895.

After graduation he joined The B. F. Goodrich Co. as a salesman from 1893 to 1895 and after a short interval in which he worked for the Palmer Pneumatic Tire Co., Chicago, Ill., he rejoined Goodrich in 1898 as manager of the St. Louis branch.

He began his long association with Adamson in 1902 and subsequently held the positions of superintendent and manager before becoming secretary-treasurer in 1909. In March, 1929, Mr. Koontz was made president and general manager. In 1930, however, he left for Chicago where he eventually joined M. B. Cook & Co. Before his retirement in 1940 he also had served as a rubber consulting engineer. He took a position during the war with Goodyear Aircraft Corp., in charge of machine tool liaison, but had to stop work when his health broke down in 1944.

The deceased held a 50-year pin in Adoniram Lodge, F.&A.M., was a member of the Exchange Club, and was also an elder in Westminster Church of Christ in St. Petersburg.

Funeral services were held in the High Street Church of Christ, Akron, O., on June 27, followed by burial in Glendale Cemetery.

Mr. Koontz leaves his wife, a daughter, two sons, a sister, a brother, and eight grandchildren.

Paige B. L'Hommedieu

PAIGE B. L'HOMMEDIEU, a retired executive assistant of Johnson & Johnson, New Brunswick, N. J., died at his home in Piscataway Township, N. J., on July 4. Before joining Johnson & Johnson he had been associated with the United States Rubber Co. for many years.

The deceased was born in Cuyahoga Falls, O., 74 years ago.

He was also active as a Mason, a director of St. Peter's General Hospital in New Brunswick, a charter member of the local Rotary Club, and a member of the Sons of the American Revolution.

Funeral services for Mr. L'Hommedieu were held at the Quackenbos Funeral Home, New Brunswick, on July 7, followed by interment at Elmwood Cemetery.

Surviving are the widow, two sons, a sister, and three grandchildren.

Arthur B. Cowdery

A STROKE caused the death on July 9, of Arthur Burnham Cowdery, former sales representative of The Barrett Division, Allied Chemical & Dye Corp., New York, N. Y. He had joined the sales force of the Barrett Co. on April 18, 1902. In 1911 he became district manager of the Montreal, P.Q., Canada, office, but in 1913 transferred to Tarvia road tar sales in New England. After that he handled Barrett's rubber compounding products and "Cumar" resin for rubber throughout the United States. This long association with Barrett was terminated when Mr. Cowdery retired on January 1, 1948.

He was born in Lowell, Mass., on June 27, 1872. He was graduated from Bradford, Vt., high school in 1889.

The deceased belonged to the Masonic Order.

Funeral services and burial took place on July 12 at Harwich Port, Mass.

Mr. Cowdery is survived by his wife and a son.

FINANCIAL

Brunswick-Balke-Collender Co., Chicago, Ill., and subsidiaries. Half ended June 30: net profit, $347,450, equal to 63¢ each on 450,000 common shares, against $156,128, or 20¢ a share, in the first half of 1949; net sales, $10,408,979, against $10,895,559.

Eagle-Picher Co., Cincinnati, O., and consolidated subsidiaries. Six months ended May 31, 1950: net profit, $759,772, equal to 85¢ each on 889,076 capital shares, compared with net loss of $2,666,113 in the 1949 period; net sales, $26,890,812, against $32,591,184.

Firestone Tire & Rubber Co., Akron, O., and subsidiaries. Six months ended April 30, 1950: net profit, $13,320,055, equal to $6.68 a common share, compared with $8,419,907, or $4.02 a share, a year earlier.

General Electric Co., Schenectady, N. Y., and consolidated affiliates. First half, 1950: net profit, $77,445,000, equal to $2.68 a common share, contrasted with $46,553,000, or $1.61 a share, a year earlier; sales, $881,050,242, against $801,756,516.

General Tire & Rubber Co., Akron, O., and subsidiaries. Six months ended May 31: net profit, $1,666,974, equal to $2.44 each on 587,419 common shares, contrasted with $474,758, or 41¢ a share, a year earlier; net sales, $45,963,253, against $45,161,156.

Hewitt-Robins, Inc., Buffalo, N. Y. Half ended June 30: net profit, $423,130, equal to $1.52 each on 278,714 capital shares, against $246,003, or 88¢ a share, in the 1949 half; net sales, $9,723,324, against $9,971,014.

Johns-Manville Corp., New York, N. Y., and subsidiaries. Half ended June 30: net profit, $10,100,687, equal to $3.26 each on 3,138,021 common shares, contrasted with $5,765,600, or $1.94 each on 2,906,062 shares, in the first half last year; sales, $88,493,577, against $76,180,959; income taxes, etc., $6,462,781, against $4,605,736.

Monsanto Chemical Co., St. Louis, Mo. Initial half, 1950: net income, $13,123,061, equal to $2.85 a common share, against $7,989,858, or $1.72 a share, in the 1949 period; net sales, $102,704,934, against $79,347,108.

Plymouth Rubber Co., Canton, Mass. Six months to May 31: net income, $209,198, equal to 23¢ a common share, against $108,813, or 12¢ a share, in the six months ended May 31, 1949.

National Automotive Fibres, Inc., Trenton, N. J., and wholly owned subsidiaries. First six months, 1950: net profit, $1,556,116, equal to $1.57 each on 996,145 capital shares, compared with $2,207,771, or $2.31 each on 953,779 shares, in the first half last year; net sales, $28,991,920, against $30,885,611.

Dewey & Almy Chemical Co., Cambridge, Mass. Initial half, 1950: net earnings, $679,770, equal to $2.12 a common share, against $174,753 in the '49 period; sales, $9,003,491, against $7,446,076.

Rohm & Haas Co., Philadelphia, Pa. Six months to June 30: net profit, $3,659,000, equal to $4.42 each on 799,849 common shares, against $2,140,000, or $2.62 each on 769,229 shares, in the corresponding period last year; sales, $38,181,000, against $31,043,000.

Skelly Oil Co., Kansas City, Mo., and subsidiary. First half, 1950: net income, $11,674,227, equal to $4.46 a common share, against $13,856,208, or $5.30 a share, in last year's half.

United States Rubber Co., New York, N. Y. June half: net earnings, $8,848,757, equal to $3.35 a common share, contrasted with $6,655,010, or $2.30 a share, in the first six months of 1949; net sales, $291,278,706, against $258,302,914.

Dividends Declared

Company	Stock	Rate	Payable	Stock of Record
Anaconda Wire & Cable Co.	Com.	$0.50	July 25	July 14
Brown Rubber Co.	Com.	0.25 q.	Sept. 1	Aug. 18
Collyer Insulated Wire Co.	Com.	0.20	Aug. 1	July 20
	Cum. Pfd.	0.50 q.	Sept. 15	Aug. 22
Crown Cork & Seal Co., Inc.	Com.	0.25 q.	Aug. 25	Aug. 8
Dayton Rubber Co.	Com.	0.15	July 25	July 10
	"A"	0.50 q.	July 25	July 10
Detroit Gasket & Mfg. Co.	Com.	0.25	July 25	July 10
DeVilbiss Co.	Com.	0.25 incr.	July 20	July 10
Dunlop Rubber Co., Ltd.	ADR	0.221	July 11	May 22
Electric Hose & Rubber Co.	Com.	0.30 extra	Aug. 21	Aug. 14
Firestone Tire & Rubber Co.	Com.	1.00	July 20	July 5
Garlock Packing Co.	Com.	0.25 q.	June 30	June 21
Goodall Rubber Co.	Com.	0.15 q.	Aug. 18	Aug. 1
Goodyear Tire & Rubber Co.	$5 Cum. Cv. Pfd.	1.25 q.	Sept. 15	Aug. 15
	Com.	1.00 q.	Sept. 15	Aug. 15
Goodyear Tire & Rubber Co. of Canada, Ltd.	Pfd.	0.50 q.	July 31	July 10
Jenkins Bros.	Com.	0.25	June 30	June 16
	Fdrs. Stock	1.00	June 30	June 16
	Pfd.	1.75	June 30	June 16
Lee Rubber & Tire Corp.	Com.	0.50 q.	Aug. 1	July 14
Mansfield Tire & Rubber Co.	Pfd.	0.30 q.	July 1	June 15
Midwest Rubber Reclaiming Co.	Com.	0.25 q.	Aug. 1	July 11
	Pfd.	0.56¼	Oct. 1	Sept. 11
Okonite Co.	Com.	1.00 q.	Aug. 1	July 25
		*Stock, 25%	Sept. 1	July 25
A. G. Spalding & Bros. Co	Com.	0.25 q.	Sept. 15	Aug. 8
Tyer Rubber Co.	$4.25 Pfd.	1.06¼ q.	Aug. 15	Aug. 8
Union Asbestos & Rubber Co.	Com.	0.25 q.	Oct. 2	Sept. 8

*One share new stock for each present share held.

Trade Lists Available

The Commercial Intelligence Branch, United States Department of Commerce, Washington, D. C., recently compiled the following trade lists, of which mimeographed copies may be obtained by American firms from this Branch and from Department of Commerce field offices at $1 a list for each country.

Aircraft & Aeronautical Equipment Importers & Dealers—Argentina; Belgium; England; Greece.

Aircraft & Aeronautical Supply & Equipment Importers & Dealers—Algeria; Bolivia; Hong Kong; Netherlands; Pakistan; Tunisia; Venezeula.

Automotive Equipment Importers & Dealers—Algeria; Australia; Belgium; Brazil; British Guiana; Ceylon; Chile; Colombia; Costa Rica; Dominican Republic; French West Indies; Greece; Haiti; Jamaica; Lebanon; Mexico; Morocco; Netherlands; Norway; Newfoundland; Pakistan; Portugal; Portuguese East Africa. Sweden; Thailand; Tunisia; Union of South Africa; Guatemala.

Automotive Product Manufacturers — Costa Rica; Cuba; Finland; Mexico.

Boot & Shoe Importers & Dealers—Australia; Belgium; Canada; Costa Rica; Cuba; Egypt; French West Indies; Hong Kong; Iraq; Jamaica; Luxembourg; Panama; Syria; Turkey.

Boot & Shoe Manufacturers—Belgium; Brazil; Costa Rica; Honduras; Hong Kong; Pakistan; Switzerland; Uruguay; Venezuela.

Boot & Shoe Manufacturers & Exporters—Cuba; New Zealand; Peru.

Electrical Supply & Equipment Importers & Dealers—Australia; Bahamas; Belgium; Bolivia; British Malaya; Burma; Chile; Colombia; Egypt; El Salvador; Finland; French West Indies; Honduras; Irish Republic; Lebanon; Luxembourg; Morocco; Netherlands; Netherlands West Indies; Pakistan; Paraguay; Spain; Syria; Trinidad. B. W. I.; Tunisia; Union of South Africa; Venezuela.

Office Supply & Equipment Importers & Dealers—Angola; Belgium; Brazil; Canada; Chile; Colombia; Finland; French West Indies; Haiti; Israel; Iran; Lebanon; Luxembourg; Netherlands; Pakistan; Siam; Spain; Sweden! Tunisia; Turkey.

Plastic Material Manufacturers & Molders, Laminators & Fabricators of Plastic Products—Australia; Brazil; Greece; Netherlands; Norway; Thailand; Union of South Africa.

Plastic Material Manufacturers & Molders of Plastic Products—Colombia; Cuba; Israel.

Plastic Materials Molders & Fabricators—Turkey.

Rubber Goods Manufacturers—Australia; Hong Kong; Israel; Korea; Morocco.

Rubber Goods Mechanical, Importers & Dealers—Pakistan.

Sporting Goods, Toy & Game Importers—Bermuda; Bolivia; Brazil; Canada; Colombia; Costa Rica; Dominican Republic; Ecuador; El Salvador; Finland; Guatemala; Haiti; Iran; Luxembourg; Panama; Paraguay; Turkey; Venezuela.

Suspender, Brace & Garter Manufacturers—Italy.

Tire Retreaders, Recappers, and Repairers—Peru; Portugal.

Additional Experimental GR-S Polymers and Latices

(*Continued from page 553*)

X-Number Designation	Manufacturing Plant	Date of Authorization	Polymer Description
X-582 GR-S	U. S. Rubber, Borger	6-7-50	A mixture of 55 parts Vulcan 3 black and 100 parts low temperature polymerized GR-S. Marasperse and NaOH used in carbon black slurry make-up. Charge ratio same as for X-580 GR-S.
X-583 GR-S	U. S. Rubber, Borger	6-7-50	Similar to X-572 GR-S unpigmented polymer. Charge ratio same as for X-580 GR-S.
X-584 GR-S	U. S. Rubber, Borger	6-7-50	A mixture of 50 parts Philblack O and 100 parts of polybutadiene. Marasperse and NaOH used in carbon black slurry make-up. Charge formulation: 100 parts butadiene; emulsified with Dresinate 214; activated with cumene hydroperoxide; and shortstopped with DNCB. Polymerized at 86° F. Mooney viscosity, 25. Stabilized with 1.5% BLE.

United States Rubber Industry Employment, Wages, Hours

	Prod. Workers 1000's	Ave. Week. Earnings	Ave. Week. Hours	Ave. Hour. Earnings	Consumers Price Index		Prod. Workers 1000's	Ave. Week. Earnings	Ave. Week. Hours	Ave. Hour. Earnings	Consumers Price Index
All Rubber Products						**Rubber Footwear**					
1939	121	$27.84	39.9	$0.745	99.4	1939	14.8	$22.80	37.5	$0.607	
1947	220	55.32	39.8	1.390	159.2	1947	23.9	48.31	41.5	1.164	
1948	209	56.78	39.0	1.456	171.2	1948	24.6	51.75	41.8	1.238	
1949						1949					
Jan.	201	56.89	37.9	1.501	170.9	Jan.	24.8	51.86	40.3	1.290	
Feb.	197	56.55	37.5	1.500	169.0	Feb.	22.9	48.15	37.5	1.284	
Mar.	194	55.43	37.0	1.498	169.5	Mar.	21.9	42.07	33.6	1.252	
Apr.	190	55.50	36.9	1.504	169.7	Apr.	21.4	46.65	37.2	1.254	
May	185	57.08	37.7	1.514	169.2	May	20.5	48.39	38.5	1.257	
June	181	58.29	38.2	1.526	169.6	June	19.8	50.35	39.4	1.278	
July	177	58.37	38.4	1.520	168.5	July	20.2	48.84	38.7	1.262	
Aug.	180	57.72	38.3	1.507	168.8	Aug.	20.3	48.78	38.9	1.254	
Sept.	167	61.01	40.3	1.514	169.6	Sept.	21.1	51.71	40 4	1.280	
Oct.	187	59.57	39.4	1.512	168.5	Oct.	21.5	49.81	39.1	1.274	
Nov.	187	58.06	38.5	1.508	168.6	Nov.	22.2	50.55	39.9	1.267	
Dec.	187	59.38	39.3	1.511	167.5	Dec.	22.2	50.31	39.8	1.264	
Tires and Tubes						**Other Rubber Products**					
1939	54.2	$33.36	35.0	$0.957		1939	51.9	$23.34	38.9	$0.605	
1947	105.8	61.75	38.5	1.604		1947	89.9	49.53	40.8	1.214	
1948	96.2	62.16	37.2	1.671		1948	88.1	52.47	40.3	1.302	
1949						1949					
Jan.	91.3	60.72	35.3	1.720		Jan.	85.3	54.38	40.1	1.356	
Feb.	89.4	60.99	35.8	1.723		Feb.	85.1	54.05	40.1	1.348	
Mar.	88.6	61.50	35.4	1.718		Mar.	83.1	52.49	39.2	1.339	
Apr.	88.6	60.92	35.4	1.721		Apr.	79.6	51.69	38.4	1.346	
May	87.2	63.20	36.3	1.741		May	77.2	52.51	39.1	1.343	
June	86.3	64.09	36.6	1.751		June	75.3	53.85	39.8	1.353	
July	82.0	64.45	36.6	1.761		July	74.5	54.11	40.2	1.346	
Aug.	80.9	62.32	36.0	1.731		Aug.	78.6	55.46	40.6	1.366	
Sept.	64.3	69.95	39.1	1.789		Sept.	81.4	56.50	41.3	1.368	
Oct.	81.1	64.83	37.3	1.738		Oct.	84.4	57.06	41.5	1.375	
Nov.	81.3	64.02	36.9	1.735		Nov.	83.2	54.09	39.6	1.366	
Dec.	82.1	65.28	37.3	1.750		Dec.	83.0	55.90	41.1	1.360	

SOURCE: BLS, United States Department of Labor, Washington, D. C.

OTS Bibliography Reports on Rubber Products—XIX

THE reports and abstracts thereof given below are taken from the Department of Commerce's monthly publication, "Bibliography of Scientific and Industrial Reports." Reports available in microfilm, enlargement print, or photostatic form may be obtained from the Library of Congress, Photoduplication Service, Publication Board Project, Washington 25, D. C., with accompanying check or money order payable to the Librarian of Congress. Reports available in printed or mimeographed form may be obtained from the Office of Technical Services, United States Department of Commerce, Washington 25, D. C., with accompanying check or money order payable to the Treasurer of the United States.

Buna S of High-Grade Electrical Properties. I. G. Farbenindustrie A. G., Schkopau. PB-100347. 1942. 12 frames. Microfilm $1.75; enlargement print $3.75. (Text in German, but includes abstract in English.) English abstract is available separately as PB-100347s; 1 page; microfilm $1.25, photostat $1.25.

Elasticizer 32, Buna 32 and 85, Buna SIII, Pervinan, and Diproxide. I. G. Farbenindustrie A.G., Schkopau. PB-100343. Oct., 1940-Dec., 1944. 236 frames. Microfilm $8.25; enlargement print $31.25. (Text in German, but includes abstract in English.) English abstract is available separately as PB-100343s; 2 pages; microfilm $1.25, photostat $1.25.

Fatty Acid-Free Buna S-4. I. G. Farbenindustrie A.G., Schkopau. PB-100083. 1943-1944. 27 frames. Microfilm $2.00; enlargement print $5.00. (Text in German and English.)

Synthesis of Rubber. Junji Furukawa, Kyoto Imperial University. PB-98752. 13 pages. Microfilm $1.75; photostat $2.50. Preliminary formulae for a new synthetic rubber embodying the manufacture of monovinylacetylene from acetylene, butadiene from monovinylacetylene, and methyl-vinyl ketone are presented. A theoretical test for polymerization is outlined.

Igelit Waste Material. I. G. Farbenindustrie A. G., Ludwigshafen. PB-100066. 1942-1943. 45 frames. Microfilm $2.50; enlargement print $7.50. (Text in German, but includes abstract in English.) English abstract is available separately as PB-100066s; 1 page; microfilm $1.25, photostat $1.25.

Testing of Igelit PCU. I.G. Farbenindustrie A.G., Schkopau. PB-99939. 1941-1944. 113 frames. Microfilm $4.74; enlargement print $16.25. (Text in German, but includes abstract in English.) English abstract is available separately as PB-99939s; 2 pages; microfilm $1.25, photostat $1.25.

Comparative Precipitation Tests of Huels and Schkopau Buna S Latices with Carbon Dioxide, Acetic Acid, and Sodium Bisulfite, with or without Addition of Iron Salts. Drs. Tilk, Weinbrenner, Baer and Stoecklin, I. G. Farbenindustrie A.G., Schkopau. PP-100544. 1939-1942. 35 frames. Microfilm $2.25; enlargement print $6.25. (Text in German, but includes abstract in English.) Abstract is also available as PB-100544s; 1 page; microfilm $1.25, photostat $1.25.

Diamyl Xanthic Acid Tetrasulfide as a Vulcanization Regulator for Buna S Mixtures. Dr. K. Loeffler, I. G. Farbenindustrie A.G., Schkopau. PB-100541. September, 1941-May, 1942. 34 frames. Microfilm $2.25; enlargement print $6.25. (Text in German, but includes abstract in English.) Abstract is also available as PB-100541s; 1 page; microfilm $1.25, photostat $1.25.

Graphs and Data Concerning Routine Tests on "Numbered Buna." I. G. Farbenindustrie A.G., Schkopau. PB-100570. 1937-1944. 250 frames. Microfilm $9.00; enlargement print $32.50. (Text in German, but includes abstract in English.) Abstract is also available as PB-100570s; 1 page; microfilm $1.25, photostat $1.25.

Tests on Buna S Strip. I. G. Farbenindustrie A.G., Schkopau. PB-100573. 1938-1944. 284 frames. Microfilm $9.00; enlargement print $38.75. (Text in German, but includes abstract in English.) Abstract is also available as PB-100573s; 1 page; microfilm $1.25, photostat $1.25.

Interdependence of Polymerizing and Processing Buna S. Dr. Klein, I. G. Farbenindustrie A.G., Schkopau. PB-100571. July, 1944. 24 frames. Microfilm $2.00; enlargement print $5.00. (Text in German, but includes abstract in English.) Abstract is also available as PB-100571s; 2 pages; microfilm $1.25, photostat $1.25.

3-Tertiary-Butyl-2-Naphthol and Cresol Methane as Stabilizers for Non-Discoloring Buna S. I. G. Farbenindustrie A.G., Schkopau. PB-100543. 1941-1943. 41 frames. Microfilm $2.50; enlargement print $7.50. (Text in German, but includes abstract in English.) Abstract is also available as PB-100543s; 2 pages; microfilm $1.25; photostat $1.25.

Tests on Buna S. I. G. Farbenindustrie A.G., Schkopau. PB-100572. 1939-1945. 396 frames. Microfilm $9.00; enlargement print $50.00. (Text in German.)

Methallyl Sulfide as a Regulator and Stabilizer in the Production and Working up of Buna. Dr. Loeffler, I. G. Farbenindustrie A.G., Schkopau. PB-100545. August, 1943. 9 frames. Microfilm $1.25; enlargement print $2.50. (Text in German, but includes abstract in English.) Abstract is also available as PB-100545s; 1 page; microfilm $1.25, photostat $1.25.

Composition of Igelit PCU Pastes and Their Applications. I. G. Farbenindustrie A.G., Schkopau. PB-100560. 1941-1944. 13 frames. Microfilm $1.75; enlargement print $3.75. (Text in German, but includes abstract in English.) Abstract is also available as PB-100560s; 1 page; microfilm $1.25, photostat $1.25.

Igelit MP Type S for Use in Injection Molding. Alterations in the Composition of Igelit Type K and KF. I. G. Farbenindustrie A.G., Schkopau. PH-100540. 1941-1942. 16 frames. Microfilm $1.75; enlargement print $3.75. (Text in German, but includes abstract in English.) Abstract is also available as PB-100540s; 1 page; microfilm $1.25, photostat $1.25.

Igelit PCU Pastes M and G Made Suitable for Dipping Purposes by Adding Hexyl Alcohol. I. G. Farbenindustrie A.G., Schkopau. PB-100536. August, 1941. 20 frames. Microfilm $1.75; enlargement print $3.75. (Text in German, but includes abstract in English.) Abstract is also available as PB-100536s; 1 page; microfilm $1.25, photostat $1.25.

Igelit PCU Pastes OI, OII, and OIII for the Manufacture of Shoe Soles. I. G. Farbenindustrie A.G., Schkopau. PB-100534. 1941. 14 frames. Microfilm $1.75; enlargement print $3.75. (Text in German, but includes abstract in English.) Abstract is also available as PB-100534s; 1 page; microfilm $1.25, photostat $1.25.

Igelit PCU Paste P for the Manufacture of Sponge Material. I. G. Farbenindustrie A.G., Schkopau. PB-100533. 1941-1943. 21 frames. Microfilm $2.00; enlargement print $5.00. (Text in German, but includes abstract in English.) Abstract is also available as PB-100533s; 2 pages; microfilm $1.25, photostat $1.25.

Igelit PCU Paste V Suitable for Bags for Wrapping Photo-Chemicals. I. G. Farbenindustrie A.G., Schkopau. PB-100532. April, 1941. 8 frames. Microfilm $1.25; enlargement print $2.50. (Text in German, but includes abstract in English.) Abstract is also available as PB-100532s; 1 page; microfilm $1.25, photostat $1.25.

Igelit PCU Plant Products: Igelit PCU Paste for the Manufacture of Heels. I. G. Farbenindustrie A.G., Schkopau. PB-100537. 1941-1942. 5 frames. Microfilm $1.25; enlargement print $2.50. (Text in German, but includes abstract in English.) Abstract is also available as PB-100537s; 1 page; microfilm $1.25, photostat $1.25.

Igelit PCU Plant Products: Igelit PCU Type L, a Raw Material for Thin Foils. I. G. Farbenindustrie A.G., Schkopau. PB-100539. 1941-1944. 26 frames. Microfilm $2.00; enlargement print $5.00. (Text in German.)

Igelit PCU Plant: Report on Experiments with Igelit PCU Pastes. I. G. Farbenindustrie A.G., Schkopau. PB-100535. 1940. 14 frames. Microfilm $1.75; enlargement print $3.75. (Text in German.)

Redux Cement. A. P. Dowling, U. S. Naval Air Materiel Center, Aeronautical Materials Laboratory, Philadelphia, Pa. PB-100404. September, 1944. 17 frames. Microfilm $1.75; enlargement print $3.75. Redux cement, a synthetic non-rubber containing heat-setting synthetic, was used to prepare metal-to-metal and metal-to-wood specimens which were tested in tensile shear. Test data indicate that while the cement is easy to use and has comparatively superior resistance to fresh and salt water, it displays a decided vulnerability toward heat in metal-to-metal joints, and inconsistent results are obtained at elevated temperatures.

Report on the Fifth Meeting of the Technical Plastics (Kuteko) Subcommittee II, Dealing with Plastics Based on Vinyl Chloride. I. G. Farbeninstrie A.G., Schkopau. PB-100538. 1942-1943. 10 frames. Microfilm $1.25; enlargement print $2.50. (Text in German, but includes abstract in English.) Abstract is also available as PB-100538s; 2 pages; microfilm $1.25, photostat $1.25.

(*To be continued*)

Foreign Trade Opportunities

The firms and individuals listed below have recently expressed their interest in buying in the United States or in United States representations. Additional information concerning each import or export opportunity, including a World Trade Directory Report, is available to qualified United States firms and may be obtained upon inquiry from the Commercial Intelligence Unit of the United States Department of Commerce, Washington, D. C., or through its field offices for $1 each. Interested United States companies should correspond directly with the concerns listed concerning any projected business arrangements.

Export Opportunities

Dott. Ing. Tito Sacco, Viale Tunisia 2, Milan, Italy: plasticizers, synthetic resins, chemicals.

Christo Loukaitis, 37 Soliman Pasha St., Cairo, Egypt: automotive spare parts and accessories.

A. I. Melnick & Co., Yomiuri-Kaikan, No. 13, 1-chome, Yuraku-Cho, Chiyoda-Ku, Tokyo, Japan: rubber.

The Trade Assn. of Korea, Seoul, Korea: rubber (raw, smoked sheets), carbon black, industrial chemicals.

C. Navermann & Co., Spaldingstrasse 64, Hamburg 1, Germany: rubber.

Kasho Co., Ltd., No. 3, 2-chome Nihonbashi-Yedobashi, Chuo-Ku, Tokyo, Japan: scrap rubber.

The Korean Industrial Development Co., Inc., Dongil Bldg., Jonglo, Seoul, Korea: raw rubber, cotton yarn.

Heinrich Krebs, Elsterbusch 3, Solingen, Germany: rubber sheets.

Wm. Glenn Stott, representing Stott's Pty. Ltd., 249-51 Johnson St., Abbotsford, Victoria, Australia: industrial adhesives, general stationery lines.

Moulded Products, Tralee, County Kerry, Ireland: plastic raw materials.

Agustin Moreno Barragan, Republica del Salvador 91, Mexico, D. F., Mexico: automobile spare parts, plastic goods, desk accessories.

Government of French West Africa, Dakar, French West Africa: tires.

Cesare Maffei, representing SIRPLES, 37 Corso Venezia, Milan, Italy: chemicals, synthetic resins, plasticizers, solvents.

Miyako Shoji Kaisha, Ltd. (Miyako Trading Co., Ltd.), 351 Rokuchome, Kitashinagawa, Shinagawaku, Tokyo, Japan: scrap rubber.

Felipe Muñoz Rodes, Jesus Maria No. 269, Habana, Cuba: fan belts, friction tape.

Libreria Ercilla, Alberto C. Garcia, 4a Ave. Norte No. 3, San Salvador, El Salvador: crepe rubber soling.

Graells, 51 Rue Saint-Francois, Bordeaux, Gironde, France: artificial leather, rubber and synthetic rubber soles, abrasives.

Société Anonyme des Etablissements Hartley & Pons, Usine de la Croix Rompue Amiens (Somme), France: cloth-base rubber boots.

SOGIMPEX, 71 Dieweg, Brussels, Belgium: electrical insulating materials.

Firma J. A. Gunters, Boschweg 56, Apeldoorn, Netherlands: belting and hose.

A. N. Khan, representing Agha Bros., Ltd., Badri Bldg., McLeod Rd., Karachi, Pakistan: machinery for chemical manufacture, laboratory equipment, electrical goods.

Hugo Visnapuu, representing North Cork, Co-operative Creameries, Ltd., Kanturk, Cork, Ireland: machinery for producing plastics and chemicals, laboratory equipment.

(*Continued on page* 584)

Patents and Trade Marks

APPLICATION

United States

2,494,649. **For Pneumatic Tires, Fabric Having a Weft of a Fiber-Forming Homopolymer of Ethylene and a Warp of Filament Yarns of Regenerated Cellulose.** H. Dreyfus, deceased, late of London, England, by C. Bonard, administrator, London, assignor to Celanese Corp. of America, a corporation of Del.

2,494,664. **An X-Ray Protective Apron of Flexible, Plastic Sheet Loaded with Heavy Material Opaque to X-Rays.** M. Lubow, Long Beach, assignor to Wolf X-Ray Products, Inc., New York, both in N. Y.

2,494,796. **Inflatable Game Ball.** W. T. Brown, West Suffield, Conn., assignor to A. G. Spalding & Bros., Inc., Chicopee, Mass.

2,494,806. **Inflated Playball Having a Fabric Carcass and a Molded Rubber Cover thereon.** F. W. Gibson, assignor to A. G. Spalding & Bros., both of Chicopee, Mass.

2,494,815. **Elastic Guide for the Suspension Shaft of the Bowl of a Cream Separator.** E. L. J. Jadoul, Brussels, Belgium.

2,494,818. **Abrading Wheel on Which Is Mounted a Channel Shaped Elastic Ring Member Designed to Seat and Support an Inelastic Band of Abrasive Material.** E. Kristek, Hustenovice, assignor to Bata, Narodni Podnik, Zlin, both in Czechoslovakia.

2,494,834. **Mounted Specimen Encased in a Molded Block of Plastic and Having a Transverse Section Exposed for Microscopic Examination. R. S. Ringheim,** San Gabriel, Calif., assignor to the United States of America, as represented by the United States Atomic Energy Commission.

2,494,849. **Packing Sleeve of Rubber-Like Material in a Flange Union Fitting.** C. B. Whitney, Sackets Harbor, N. Y., assignor to New York Air Brake Co., a corporation of N. J.

2,495,008. **Adhesive Tape Having on One Face a Latex-Base Adhesive and on the Other a Thermoplastic Backing Non-Blocking to the Adhesive.** C. M. Keaton, assignor to American-Marietta Co., both of Seattle, Wash.

2,495,028. **Sponge Rubber Shoulder Pad.** A. N. Spanel, Dover, Del.

2,495,045. **Laminated Plastic Removable Insole.** R. L. Woodbury, United States Army, Litchfield, Conn., and E. P. Hanson, Long Island City, N. Y.

2,495,079. **Game Ball with an Inflatable Molded Grooved Carcass.** W. A. and W. J. Sonnett, both of Ada, O.

2,495,082. **Pneumatic Jack Inflatable by Exhaust of Automobiles.** J. H. Cox, Seville, and R. L. Miller, assignors to Firestone Tire & Rubber Co., both of Akron, both in O.

2,495,114. **Therapeutic Bag with Sealing Closure.** C. W. Leguillon, Akron, and C. P. Krupp, Barberton, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,495,124. **Air Filled Upholstery Member Including Two Contiguous Layers of Air-Filled Cells.** H. G. Morner, New York, N. Y.

2,495,172. **Conductors Insulated with Synthetic Enamels.** C. B. Leape, Wilkinsburg, Pa., assignor to Westinghouse Electric Corp., East Pittsburgh, Pa.

2,495,173. **Non-Crystalline Synthetic Resin Holder for Holding Samples for X-Ray Diffraction.** C. B. Leape, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., East Pittsburgh, Pa.

2,495,195. **Shoe Splash Guard of Thin Resilient Plastic Material.** R. F. Denzer, Attleboro, Mass.

2,495,254. **Patch for an Inflatable Device.** H. E. Heigis, Nutley, assignor to Specialties Development Corp., Belleville, both in N. J.

2,495,277. **Use of Methacrylate Resin in a Lubricant for Coating an Extrudable Cork Composition.** V. A. Navikas, assignor to Armstrong Cork Co., both of Lancaster, Pa.

2,495,306. **Methyl Silicone Resin in a Heat-Resisting Paint.** P. Zurcher, Ponca City, Okla.

2,495,307. **Breast Shield for Nursing Mothers.** M. Abramson, Minneapolis, Minn.

2,495,316. **For Controlling the Distribution, Pressure, and Circulation of Body Fluids, a Garment Including Leg Portions Incorporating a Series of Bladders Connected by Tubes, and Fluid Supply Tubes Connected to Individual Bladders.** D. M. Clark, Worcester, Mass., and E. H. Wood, Rochester, Minn.; Wood assignor to Clark.

2,495,405. **In a Refrigerator, Elastic U-Shaped Cushion Covering Forming the Abutting Surface for the Door.** R. H. Bishop, Champaign, Ill.

2,495,499. **In a Light Filter Transmitting Infrared Radiation and Opaque to Visible Light, at Least One Layer of Plastic of the Class of Polyvinyl Alcohol, Polyvinyl Acetate, Polyvinyl Acetal and Polyvinyl Butyral.** W. F. Amon, Jr., Boston, and E. R. Blout, assignors to Polaroid Corp., both of Cambridge, both in Mass.

2,495,500. **In a Light Filter Transmitting Infrared Radiation and Opaque to Visible Light, a Coating of Urea Formaldehyde or Melamine Formaldehyde Resin Containing Acid Black G.** W. F. Amon, Jr., Boston, and E. R. Blout, assignors to Polaroid Corp., both of Cambridge, both in Mass.

2,495,548. **Nursing Unit with Flow Adjustment Means.** H. J. Revane, Norfolk, Va.

2,495,602. **Protective Pad for Bathtubs.** D. Rinaldi, Ambridge, Pa.

2,495,636. **Sound-Insulating Pad Made of Loosely Matted Fibrous Material Covered on One Side with Fabric; the Other Side Is Provided with a Synthetic Resin Film Integralized with the Fibers on That Face.** O. R. Hoeltzel, W. S. Saville, and J. W. Larson, all of Fort Worth, Tex., assignors to Consolidated Vultee Aircraft Corp., San Diego, Calif.

2,495,653. **In an Engine Starter Drive, an Elastic Compression Member on a Nut Engaging the Driving Clutch Member.** J. J. Digby, Elmira, assignor to Bendix Aviation Corp., Elmira Heights, both in N. Y.

2,495,660. **In a Packing, an Annular Sealing Element of Synthetic Rubber Adapted to Remain Resilient at Sub-Zero Temperatures.** V. W. Peterson and O. J. Maha, Chicago, Ill., assignors to Hannifin Corp., a corporation of Ill.

2,495,666. **Inserting Treated Yarns in a Rubber Base in Making Pile Fabrics.** C. F. Taubert, assignor of one-half to E. H. Taubert, both of Scarsdale, N. Y.

Dominion of Canada

461,986. **Elastic Elements in a Health Garment for Men.** M. M. Weiss, Bronx, N. Y., U.S.A.

462,034 **Stretched Synthetic Textile Yarn Including Filaments Formed from a Vinyl Resin.** E. W. Rugeley, T. A. Feild, Jr., and J. L. Petrokubi, all of Charleston, W. Va., U.S.A., assignors to Carbide & Carbon Chemicals Ltd., Toronto, Ont.

462,042. **Wire Reinforced Belt for Industrial Purposes.** A. L. Freedlander, E. H. Kremer, and D. L. Waugh, assignors to Dayton Rubber Co., all of Dayton, O., U.S.A.

462,043. **Inflation Value of Resilient Flexible Material.** G. E. Gott, Arlington, assignor to Dewey & Almy Chemical Co., Cambridge, both in Mass., U.S.A.

462,060. **Tire Tread.** A. Hargraves, Cuyahoga Falls, assignor to Firestone Tire & Rubber Co., Akron, both in O., U.S.A.

462,141. **Rubber Hydrochloride Sausage Casing with Longitudinal Reinforcing Strips.** L. A. Goodman, assignor of one-half to Marcleph & Co., Inc., both of New York, N. Y., U.S.A.

462,165. **Resilient Core Member in a Shoulder Pad Construction.** E. D. Gerry, New York, N. Y., U.S.A.

462,185. **In a Pump for Moving Sludges and the Like, a Resilient Deformable Tube on a Resiliently Mounted Platform and Rubber-Like Saddle Members between Tube and Platform.** R. K. Stocks, Johannesburg, Transvaal, Union of South Africa.

462,219. **Vibration Absorbing and Attaching Unit Including a Body of Resilient Rubber or the Like.** L. L. Smith, assignor to Continental Rubber Works, both of Erie, Pa., U.S.A.

462,237. **Electrically Heated Flexible Covering for Preventing the Accumulation of Ice on a Surface.** B. J. Jones, Cuyahoga Falls, and P. E. Coonly, Akron, both in O., assignors to B. F. Goodrich Co., New York, N. Y., both in the U.S.A.

462,274. **Rubber-Covered Auto Accelerator Pedal.** C. Fuller, assignor to Universal Accessories, Ltd., both of Toronto, Ont.

462,324. **Sealing Packing Including a Corrugated Metal Ring Mounted in Rubber.** L. M. C. Seamark, Lyme Regis, Dorset, England.

462,359. **Seat for a Mechanical Seal Including a Ceramic Ring Embedded in a Molded Body.** R. D. Snyder and C. E. Schmitz, Chicago, Ill., and E. J. Coleman, Stamford, Conn., assignors to Crane Packing Co., Chicago, both in the U.S.A.

462,372. **Sealing Ring of Elastic Material for Insertion between Concentric Cylindrical Surfaces.** T. H. Winkeljohn, Wabash, Ind., assignor to General Tire & Rubber Co., Akron, O., both in the U.S.A.

462,436. **Oil Seal Means Including a Body of Rubber-Like Material.** O. Brummer, Oak Park, Ill., U.S.A.

462,454. **In a Method of Molding Concrete, the Use of a Movable Molding Member Wholly or Partly Consisting of Flexible Material and Adapted to Contain Air, Water, or the Like.** O. V. Sjodin, Stocksund, Sweden.

462,558. **In the Preparation of a Lubricant, the Addition of an Interpolymer of Ethylene and Isobutylene.** P. K. Frolich, Westfield, and H. B. Kellog, Union City, assignors to Standard Oil Development Co., Linden, all in N. J., U.S.A.

462,594. **In an Automobile Wheel, a Tire in Which a Cylindrical Body of Elastic, Flexible Material Takes the Place of Compressed Air and Is Held under Compression in the Tire.** J. A. Belanger, Riviere Bleue, P.Q.

462,601. **In a Seal Unit for a Hydraulic Shock Absorber, a Split Bushing of Rubber.** M. H. Evans, Elmira, N. Y., U.S.A.

462,602. **Closure for a Container Having at Least Two Separate Diaphragms Formed Integral with the Body of the Closure and Pierceable by a Hypodermic Needle.** W. S. Freeman, Leeds, Yorkshire, England.

462,612. **Collapsible Inflatable Shelter.** E. Lewis, Shequiandah, Ont.

462,629. **In a Pontoon Including a Hollow Body Partitioned into Compartments, and a Bottom Closure for the Compartments Pivotally Secured to the Body; an Inflated Member in Each Compartment Exerts Pressure against the Bottom.** W. J. Sanderson, Malton, Ont.

462,684. **Flexible Joint or Tube Fitting.** J. F. Stephens, assignor to Gustin-Bacon Mfg. Co., both of Kansas City, Mo., U.S.A.

462,690. **Bathing Cap.** G. G. Kent, assignor to Long & Hambly, Ltd., both of High Wycombe, Buckinghamshire, England.

462,699. **In a Sump Selector Valve, a Ring Seat of Rubber or Similar Resilient Yieldable Material.** J. F. Melichar and W. Margrave, assignors to Parker Appliance Co., all of Cleveland, O., U.S.A.

462,730. **Film of Melamine-Formaldehyde Resin for Insulating Magnetic Sheet Material.** P. L. Schmidt, Peerysville, Pa., and J. A. Campbell, Lincoln, Neb., assignors to Westinghouse Electric Corp., East Pittsburgh, Pa., both in the U.S.A.

United Kingdom

632,868. **Composite Resilient Bushing.** T. L. Fawick.

633,012. **Flexible Abrasive Articles.** Minnesota Mining & Mfg. Co.

633,087. **Pneumatic Couplings.** T. Tyse.

633,384. **Vehicle Suspension.** B. F. Goodrich Co.

633,442. **Sectional Airbags to Repair Pneumatic Tire Covers.** G. V. Ariso.

633,515. **Shock Absorber for Automobiles or Similar Sprung Vehicles.** S. B. Adamson.

633,521. **Shoe Heel with Elastic Chambers.** V. Slampa and J. Hermann.

633,733. **Resilient Mountings and Supports.** Metalastik, Ltd., and A. J. Hirst.

633,783. **Nursing Units.** A. M. Allen and M. L. van Evera.

633,943. **Compound Sheet Dielectric Structures.** J. B. Birks.

633,976. **Rubber Hose.** G. Spencer Moulton & Co., Ltd., J. M. Chrystal, and W. C. Holbrook.

634,055. **Weather Excluders, Etc., for Doors and Windows.** Morris Motors, Ltd., and T. W. Ramsay.

634,111 and 634,115. **Vehicle Suspension Systems.** Dunlop Rubber Co., Ltd., and R. M. Seddon.

634,121. **Elastomeric Semi-Conducting Resilient Members or Material.** Westinghouse Electrical International Co.

634,139. **Cushioning Devices for the Chucks of Rock Drilling Machines.** Ingersoll-Rand Co.

634,161. **Mask for Breathing Apparatus.** S. G. Dehn (Diving Equipment & Supply Co., Inc.).

634,280. **Molding for Vehicle Bumper Bars.** Weathershields, Ltd., and W. H. Bishop.

PROCESS

United Kingdom

632,995. **Film of Thermoplastic Material.** B. F. Goodrich Co.

633,631. **Finished Leather or Leather Splits and Method of Finishing Same.** B. F. Goodrich Co.

633,805. **Floor Coverings and the Like.** British Rubber Producers' Research Association and C. M. Blow.

633,826. **Mounting Metal Elements in Thermoplastic Materials.** R. C. de Holzer.

634,056. **Insulated Electric Conductors.** Pirelli Soc. per Azioni.

634,071. **Molding Plastic Materials by Extrusion.** R. Colombo.

United States

2,496,963. **Sealing Rubber Hydrochloride Surfaces.** J. E. Snyder, assignor to Wingfoot Corp., both of Akron, O.

2,497,226. **Pneumatic Tires.** G. K. McNeill, Detroit, Mich., assignor to United States Rubber Co., New York, N. Y.

2,497,346. **Coloring Plastics.** H. M. Collins, Vaughan, assignor to Reliable Plastics Co., Ltd., Toronto, both in Ont., Canada.

2,497,376. **Polymeric Ethylene Terephthalate Films.** J. C. Swallow and D. K. Baird, Welwyn Garden City, and B. P. Ridge, Potters Bar, both in England, assignors to Imperial Chemical Industries, Ltd., a corporation of Great Britain.

2,497,454. **Composite Products of Rubber and Rayon.** J. W. Illingworth, and E. W. Madge, both of Sutton Coldfield, England, assignors to Dunlop Tire & Rubber Corp., Buffalo, N. Y.

2,497,526. **Increasing Dye Receptivity of Polymeric Nitrile by Treatment with Hydrazine.** H. W. Arnold, Claymont, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,497,774. **Vaned Tires.** R. W. Hursh, Erlton, N. J., assignor to B. F. Goodrich Co., New York, N. Y.

2,498,074. **Forming Relatively Large Solid Objects in Relatively Small-Mouthed Transparent Containers.** J. E. Feldman, Garfield, N. J., assignor to United States Rubber Co., New York, N. Y.

CHEMICAL

United States

2,496,222. **Continuous Process for the Emulsion Polymerization of a Vinylidene Compound.** E. C. H. Kolvoort and G. Akkerman, both of Amsterdam, Netherlands, assignors to Shell Development Co., San Francisco, Calif.

2,496,226. **Stable Dispersions of High Molecular Products Obtained by Reacting a Dihalogen Substituted Paraffin with an Alkaline Polysulfide in Aqueous Medium in the Presence of a Dispersion Consisting Essentially of a Water Soluble Salt of a Sulfuric Acid Ester of a Monovalent Aliphatic Alcohol.** J. Overhoff and H. W. Huyser, both of Amsterdam, Netherlands, assignors to Shell Development Co., San Francisco, Calif.

2,496,227. **Production of Highly Concentrated, Stable Dispersions of the High Molecular Weight Products of Reaction of a Dichlor-Substituted Paraffin with an Alkaline Polysulfide in Aqueous Medium in the Presence of a Dispersing Agent, Which Includes Treatment with an Inorganic Elec.rolyte.** H. Eilers, J. Overhoff, and J. C. Vlugter, all of Amsterdam, Netherlands, assignors to Shell Development Co., San Francisco, Calif.

2,496,267. **As a New Composition of Matter, a Copolymer of Acrylonitrile and Vinyl Acetate Dissolved in Acetonitrile.** D. W. Chaney, Nether Providence Townships, Pa., assignor to American Viscose Corp., Wilmington, Del.

2,496,275. **Copolymer of the Vinyl Ester of Maleamic Acid and Vinyl Acetate.** J. D. Dickey, assignor to Eastman Kodak Co., both of Rochester, N. Y.

2,496,384. **Emulsion Polymerization Process for the Manufac'ure of Copolymers of Homogeneous Composition.** W. L. J. de Nie, Amsterdam, Netherlands, assignor to Shell Development Co., San Francisco, Calif.

2,496,390. **In the Polymerization of Conjugated Diolefins, the Improvement of Catalyzing the Polymerization with a Peroxide of a Cyclic Ether.** H. M. Guinot, Versailles, assignor to Les Usines de Melles (S.A.), Saint-Leger-Les-Melle, both in France.

2,496,480. **Preparation of Polyvinyl Butyraldehyde Acetal Resin of Improved Stability.** E. Lavin and A. T. Marinaro, both of Springfield, and W. R. Richard, West Springfield, assignors to Shawinigan Resins Corp., Springfield, both in Mass.

2,496,653. **Continuous Process for Polymerizing Styrene in a Closed System.** I. Allen, Jr., and W. R. Marshall, both of Bloomfield, and G. E. Wightman, Upper Montclair, both in N. J., assignors, by mesne assignments, to Union Carbide & Carbon Corp., a corporation of N. Y.

2,496,669. **Production of Synthetic Resin from Thiophene Contacted with Styrene in the Presence of Hydrogen Fluoride.** J. R. Meadow, Lexington, Ky., and A. A. O'Kelly, Woodbury, N. J., assignors to Socony Vacuum Oil Co., Inc., a corporation of N. Y.

2,496,697. **Styrene-Substituted Benzalacetophenone Copolymers.** E. C. Chapin, Dayton, O., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,496,852. **Strong Flexible Film from 60 Parts Gamma Polyvinyl Chloride and 40 Parts Di-(2-Ethylhexyl) Tetrachlorophthalate.** G. J. Bohrer, Troy, N. Y., assignor to General Electric Co., a corporation of N. Y.

2,496,864. **Production of a Crystal-Clear Polystyrene Having a Heat Distortion Temperature of at Least 90° C.** E. F. Fiedler, Adams, and G. R. Lucas, Pittsfield, both in Mass., assignors to General Electric Co., a corporation of N. Y.

2,496,867. **Preparation of 3-Vinylpyrene.** R. G. Flowers, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,496,868. **Polymers of 3-Vinylpyrene.** R. G. Flowers, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,496,907. **Preparation of Concentrated Dispersions of Solid Polymers of Ethylene.** F. Dawson, Manchester, England, assignor to Imperial Chemical Industries Ltd., a corporation of Great Britain.

2,496,934. **A Non-Drying Adhesive Including a Polyester of a Dihydric Alcohol with a Dimer of a Fatty Acid Containing at Least Two Double-Bonds, and Resinous Cyclized Rubber.** C. M. Carson, Cuyahoga Falls, assignor to Wingfoot Corp., Akron, both in O.

2,496,935. **Copolymers Including Terpinyl Methacrylate Interpolymerized with Butadiene-1,3.** A. M. Clifford, Stow, assignor to Wingfoot Corp., Akron, both in O.

2,496,941. **N-(Di-Alkyl Thiocarbamyl-Thio-Methylene) N-Phenyl Napthylamines.** A. F. Hardman, assignor to Wingfoot Corp., both of Akron, O.

2,496,948. **For Coating Insulation of an Electrical Device, a Composition Including a Copolymer of Styrene and an Alkyd Resin to Which Is Added an Alcohol-Soluble Resin Prepared from Extract of Pine Wood Chips.** R. P. Lutz, Oak Park, Ill., assignor to Western Electric Co., Inc., New York, N. Y.

2,496,976. **Transparent Wrapping Film from a Copolymer of 2,3-Dichloro-1,3-Butadiene with Another 1,3-Diene.** A. L. Barney, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,496,989. **Aqueous Dispersion of Ethylene Polymers Containing a Salt of a Polymeric Amic Acid.** M. E. Cupery, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,497,045. **Polyvinyl Resin Dispersions in Petroleum Hydrocarbon Oil.** R. B. Killingsworth, Douglaston, and R. S. Sheie, West Brighton, both in N. Y., assignors to Socony-Vacuum Oil Co., Inc., a corporation of N. Y.

2,497,046. **Fluorination of a Synthetic Aliphatic High Molecular Weight Polymer of a Halogenated Ethylene Monomer.** E. L. Kropa, Old Greenwich, Conn., assignor to American Cyanamid Co., New York, N. Y.

2,497,073-074. **Reaction Products of Dicyandiamide with an Amine-Formaldehyde Reaction Product, and Urea-Formaldehyde Resins Modified therewith.** J. R. Dudley, Darien, and J. A. Anthes, Springdale, both in Conn., assignors to American Cyanamid Co., New York, N. Y.

2,497,107. **Polymerizing Conjugated Dienes and a Mixture of a Conjugated Diene with a Different Copolymerizable Compound Containing a Vinyl Radical in an Aqueous Emulsion in the Presence of Selected Alkyl Esters of Mercaptyl Undecanoic Acids as Polymerization Regulators.** K. H. Weber, Washington, D. C., assignor to Armstrong Cork Co., Lancaster, Pa.

2,497,191. **Production of Isobutylene.** C. T. Steele and E. A. Epps, Jr., both of Baton Rouge, La., assignors to Standard Oil Development Co., a corporation of Del.

2,497,259. **Solutions of Acetone Insoluble Polymers Prepared from Styrene in a Mixture of Carbon Disulfide with Acetone.** J. P. C. E. Corbiere, Lyon, assignor to Societe "Rhodiaceta," Paris, both in France.

2,497,291. **Solid Ethylene/Vinyl Chloride Polymer at Least 20% Soluble (by Weight) in an Aromatic Hydrocarbon Solvent.** M. M. Brubaker, Boothwyn, Pa., J. R. Roland, Wilmington, Del., and M. D. Peterson, Oak Ridge, Tenn., assignors to E. I. du Pont de Nemours & Co., Inc., Wilmington.

2,497,315. **Preparation of Solid Polymers from Glycols and 1,3-Dioxolane.** D. J. Loder and E. F. Gresham, assignors to E. I. du Pont de Nemours & Co., Inc., all of Wilmington, Del.

2,497,323. **Polymerizing Ethylene by Heating at a Temperature of 70 to 250° C. in the Presence of a Tertiary Alkyl Percarboxylate.** M. J. Roedel, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,497,447. **Emulsion Polymerization of Butadiene-1,3 Hydrocarbons with Silica Sol as Catalyst.** A. J. Green, Waterbury, Conn., assignor to United States Rubber Co., New York, N. Y.

2,497,451. **Preparation of a Prosthesis of Great Strength from Methyl Methacrylate Monomer and Polymer.** M. Haefeli, Basel, Switzerland.

2,497,458. **Composition of Matter Including a Major Proportion of a Butadiene-Styrene Rubber and a Minor Proportion of a Tackifier Produced by Low-Temperature Polymerization of a Mixture Including an Isomonoolefin, an Alipathic 1,3 Conjugated Diolefin, and Styrene.** S. S. Kurtz, Merion, Pa., assignor to Sun Oil Co., Philadelphia, Pa.

2,497,464. **Improved Method of Making a Synthetic Rubber-Clay Masterbatch Which Includes Treatment with a Glue-Containing Coagulant Solution.** R. E. Meeker, South Charleston, W. Va., and H. J. E. Segrave, Washington, D. C., assignors to United States Rubber Co., New York, N. Y.

2,497,483. **As a New Compound, 1-Acetyl-2-Methyl-2-Chloromethylcyclopropane.** K. E. Wilzbach, Chicago, Ill., assignor to United States Rubber Co., New York, N. Y.

2,497,638. **Copolymers of Alkenyl Diesters of Alkenylphosphonic Acids with Methyl Methacrylate.** A. D. F. Toy, Chicago, Ill., assignor to Victor Chemical Works, a corporation of Ill.

2,497,705. **Copolymerization Product of a N-Vinyl Lactam and a Polymerizable Ester of a Monocarboxylic Acid.** J. H. Werntz, assignor to E. I. du Pont de Nemours & Co., Inc., both of Wilmington, Del.

2,497,828. **Controlled Polymerization of Vinyl Acetate in Aqueous Emulsion in Presence of Hydrogen Peroxide, as Catalyst, and Formaldehyde Sulfoxylate as Activator.** J. H. Young, Niagara Falls, N. Y., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,497,833. **Fairly Hard Rubbery Transparent Synthetic Polymer of Butadiene-1,3, Containing a Tetra-Aryl Succino Di-Nitrile.** D. Josefowitz, New York, N. Y., assignor to Publicker Industries Inc., Philadelphia, Pa.

2,497,920. **Plasticized Material Containing 80 to 60% by Weight of a Vinyl Chloride Polymer and 20 to 40% of a Compatible Phosphonate Ester.** W. H. Woodstock, Flossmoor, Ill., assignor to Victor Chemical Works, a corporation of Ill.

2,497,926. **Insolubilization of Resins from an Ester of 1-Hydroxy-1,3-Butadiene and an Aliphatic, Monocarboxylic Acid of 2 to 4 Carbon Atoms by Reacting with a Basic Nitrogen Compound.** H. A. Bruson, Rydal, assignor, by mesne assignments, to Rohm & Haas Co., Philadelphia, both in Pa.

2,497,955. **Iminoester Resins.** W. D. Niederhauser, Philadelphia, and H. A. Bruson, Rydal, assignors, by mesne assignments, to Rohm & Haas Co., Philadelphia, both in Pa.

2,497,968. **Production of a High Molecular Weight Polyester by Reacting a Methyl Dilinoleate with Decamethylene Glycol in the Presence of Zinc Dilinoleate.** D. W. Young, Roselle, and J. P. Rocca, Linden, both in N. J., assignors to Standard Oil Development Co., a corporation of Del.

2,498,084. **Soluble Unsaturated Binary Copolymer of a Di-2-Alkenyl Fumarate and a Chlorinated Alkene.** J. G. Kuderna, Jr., Passaic, N. J., and R. H. Snyder, Chicago, Ill., assignors to United States Rubber Co., New York, N. Y.

2,498,091. **Coating Composition Including Cellulose Nitrate, Polymerizable Dimethacrylate Esters of a Mixture of Glycols, a Plasticizer and a Pigment.** W. K. Moffett, Flint, Mich., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,498,099. **Interpolymers of Styrene, Fumaric Esters and Chlorinated Alkenes.** P. O. Tawney and J. G. Kuderna, Jr., both of Passaic, N. J., assignors to United States Rubber Co., New York, N. Y.

2,498,226. **Polymerization of Compounds Containing a Terminal Methylene Group.** B. T. D. Sully, Ewell, assignor to A. Boake Roberts & Co., Ltd., London, both in England.

2,498,338. **For a Pressure-Sensitive Adhesive Tape, a Coating Including a Modified Factice Composition Containing an Oil Factice and Natural or Synthetic Rubber, Tackifying Resin and Liquid Plasticizer.** J. B. Martin, Glen Ellyn, Ill., assignor to Kendall Co., Boston, Mass.

2,498,398. **Reclaiming Composite Material Including Rubber and Cellulosic Fiber, Which Includes Treatment with the Aqueous Vapors of a Mineral Acid.** P. J. Dasher, Willoughby, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,498,453. **Polyvinyl Chloride Composition Plasticized with a Mixture Including a Compatible Ester and a Sulfuric Acid Treated High-Boiling Petroleum Extract.** A. A. Schaerer, El Cerrito, assignor to Shell Development Co., San Francisco, both in Calif.

2,498,474. **Polymeric Monovinyldibenzofuran.** E. A. Kern and R. K. Abbott, Jr., Pittsfield, Mass., assignors to General Electric Co., a corporation of N. Y.

2,498,532. **Polymerized Vinyl Chloride or 1,3-Butadiene Acrylonitrile Copolymer Plasticized with Dibutyl Dihydracrylate.** R. T. Dean, Baltimore, Md., assignor to American Cyanamid Co., New York, N. Y.

2,498,533. **Resinous Composition Including the Condensation Product of a Linear Condensation Polymer of a Member of the Group of the Dihydric Alcohols, the Diamines and the Amino-Alcohols with a Cyclohexadiene Dicarboxylic Acid, and a Linear Condensation Polymer of a Member of said Group and an Alpha, Beta Ethylenically Unsaturated Aliphatic Dicarboxylic Acid.** L. H. Dimpfl, Berkeley, assignor to California Research Corp., San Francisco, both in Calif.

Dominion of Canada

462,049. **Copolymer of Vinylidene Chloride, Isobutene and a Polymerizable Aliphatic Monoethenic Compound.** H. P. Staudinger, Ewell, and D. Faulkner, Cambridge, both in England, assignors to Distillers Co., Ltd., Edinburgh, Scotland.

462,052. **Acyl Thiocarbamo Sulfenamides.** P. T. Paul, Naugatuck, Conn., U.S.A., assignor to Atlantic Refining Co., Philadelphia, treal, P.Q.

462,053. **An N'-Disubstituted Thiocarbamyl Sulfenamide.** P. T. Paul, Naugatuck, and B. A. Hunter, Oxford, both in Conn., U.S.A., assignors to Dominion Rubber Co., Ltd., Montreal, P.Q.

462,199. **Polymerization of Alpha Alkyl Styrenes.** R. G. Heiligmann, Yeadon, assignor to Atlantic Refining Co., Philadelphia, both in Pa., U.S.A.

462,200. **Unsaturated Dimers of Alpha Alkyl Styrenes.** A. B. Hersberger, Drexel Hill, and R. G. Heiligmann, Yeadon, assignors to Atlantic Refining Co., Philadelphia, all in Pa., U.S.A.

462,201. **Polymerization of Alpha Alkyl Styrene.** A. B. Hersberger, Drexel Hill, assignor to Atlantic Refining Co., Philadelphia, both in Pa., U.S.A.

462,296. **Adhesive for Bonding Rubber to Metal.** T. R. Griffith, assignor to Honorary Advisory Council for Scientific & Industrial Research, assignor to R. J. Reaney, all of Ottawa, Ont.

462,335. **Polymerizing Alpha Alkyl Styrenes by Contacting with Sulfuric Acid of Concentration between 80 and 98% at a Temperature between —50 and —100° C.** R. G. Heiligmann and J. C. Reid, Jr., both of Yeadon, assignors to Atlantic Refining Co., Philadelphia, both in Pa., U.S.A.

462,351. **Polymerized Vinyl and Acetenyl Products.** B. T. D. Sully, Ewell, England, assignor to A. Boake, Roberts & Co., Ltd., London, both in England.

462,368. **Producing Uniform High Molecular Weight Rubber-Like Form-Stable Vinyl Ether Polymers or Copolymers by Polymerizing below —10° C. with a Boron Halide Catalyst in a Solvent Diluent Including a Normally Gaseous Aliphatic Hydrocarbon Having a Selective Solvent Action for the Lower Weight Polymers Formed in the Reaction.** C. E. Schildknecht, Easton, Pa., U.S.A., assignor to General Aniline & Film Corp., New York, N. Y., U.S.A.

462,369. **Heat Polymerizable N-Vinyl Pyrrole Composition Containing Formamide, Acetamide, or Acetoacetanilide.** W. O. Ney, Easton, Pa., assignor to General Aniline & Film Corp., New York, N. Y., both in the U.S.A.

United Kingdom

632,722. **Synthetic Rubber-Resin Compositions.** United States Rubber Co.

632,757-760. **Plastic Compositions.** Imperial Chemical Industries, Ltd., and H. G. Reid.

623,824. **Organohalosilanes.** Dow Corning Corp.

632,922. **Plasticizing Substances for Resins.** Cie. Française de Raffinage.

632,928-929. **Stabilizing Solutions of Polythionates or Polythionic Acids.** Norsk Sulfo A.S.

632,936. **Resinous Anion Exchange Products.** Soc. l'Auxiliaire des Cheminc de Fer et de l'Industrie.

632,954-955. **Polysiloxanes.** British Thomson-Houston Co., Ltd.

632,997. **Interpolyamides.** J. G. N. Drewitt and G. F. Harding.

633,001. **Acrylonitrile.** American Cyanamid Co.

633,211. **Vinyl Chloride.** N. V. De Bataafsche Petroleum Mij.

633,239-240. **Thiophene and Alkyl Derivatives of Thiophene.** Socony-Vacuum Oil Co.

633,356. **Resinous Compositions Including Amino-Formaldehyde Condensation Products.** British Industrial Plastics, Ltd.

633,416. **Liquid Adhesive Cement Compositions and Composite Structures Including Them.** Minnesota Mining & Mfg. Co.

633,438. **Preparing Resinous Condensation Products.** Monsanto Chemical Co.

633,463. **Preparation of Rubber-Hydrohalide Dispersions.** Rubber-Stichting.

633,621. **Resinous Compositions.** Westinghouse Electric International Co.

633,630. **Forming Strong Homogeneous Coherent Coatings and Films.** B. F. Goodrich Co.

633,678. **Organic Fluorine Compounds.** Imperial Chemical Industries, Ltd., H. R. Leech, and R. Le G. Burnett.

633,681. **Synthesizing Vinyl Esters of Carboxylic Acids.** Soc. Belge de l'Azote & des Produits Chimiques du Marly.

633,711. **Compounds Containing the Isoprene Grouping.** L. E. Jones (Distillation Products, Inc.).

633,725. **Preparing Lignin Reinforced Rubber.** West Virginia Pulp & Paper Co.

MACHINERY

United States

2,495,680. **Device to Join Pieces of Plastic.** A. M. Andrews, Portland, Oreg.

2,495,764. **Apparatus for Removing Rubber and the Like from Bodies to Which Affixed.** W. W. Ransom, Moline, Ill.

2,496,014. **Apparatus to Form Thermoplastic Molds for Use in Electrotyping.** R. R. Myers, Des Moines, Iowa.

2,496,137. **Tire Building Machine.** F. S. Sternad, Cuyahoga Falls, and J. P. Sapp, Kent, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,496,625. **Apparatus for Advancing and Working Plastic Materials.** G. E. Henning, Baltimore, Md., assignor to Western Electric Co., Inc., New York, N. Y.

2,496,627. **Tester of Rupture Strength of Sheet Material.** H. C. Johnston, assignor to General Motors Corp., both of Dayton, O.

2,496,911. **Apparatus for Forming Plastic Laminates.** L. B. Green, Glendale, Calif., assignor by mesne assignments, to Shellmar Products Corp., Chicago, Ill.

2,498,264. **Plastics Injection Molding Machine.** F. K. Goldhard, London, England.

United Kingdom

633,568. **Injection Molding Apparatus.** A. W. E. Hartley.

633,793. **Injection Molding Apparatus for Forming Rubber and Like Inserts.** United States Rubber Co.

633,965. **Liquid Pressure Systems.** Dunlop Rubber Co., Ltd., and H. J. Butler.

634,048. **Mixers.** Redfern's Rubber Works Ltd.

634,105. **Machines for Pelletizing Rubber or Other Plastic Materials.** F. E. Brown.

634,127. **Rubber Strip Vulcanizer.** American Hard Rubber Co.

634,234. **Injection Molding Machines.** Lester Engineering Co.

UNCLASSIFIED

United States

2,497,707-708. **Method and Tool for Making High-Frequency Cable Joints.** L. Wetherill, Pittsfield, Mass., assignor to General Electric Co., a corporation of New York.

2,497,906. **Valved Hose Connection.** G. E. Peters and L. E. Russell, assignors to Peters & Russell, Inc., all of Springfield, O.

2,498,265. **Device to Measure Adherence of Organic Coating Material to a Surface.** H. Green, deceased, late of Forks Township, by M. I. Green, executrix, Easton, both in Pa., assignor to Interchemical Corp., New York, N. Y.

2,498,395. **High-Pressure Swivel Hose Coupling.** G. R. Coss, St. Clair Shores, assignor to Flex-O-Tube Co., Detroit, both in Mich.

TRADE MARKS

United States

513,840. Representation of a geometric figure containing the words: **"Reso-Rubr."** Cement. Benjamin Foster Co., Philadelphia, Pa.

513,847. Representation of a shield containing the word: **"Amres."** Resin adhesive bonding. American-Merietta Co., Chicago, Ill.

513,853. **Duco.** Cement. E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

513,898. **Behrlon.** Adhesives. Behr-Manning Corp., Troy, N. Y.

513,968. Representation of a diamond in the left-hand corner of which is the word: **"Matchless."** Buffing and polishing compound for rubber, plastics, etc. Matchless Metal Polish Co., Chicago, Ill.

513,991. Representation of a circle containing the words: **"Armstrong Cork Company"** and an inner black circle containing the letter: **"A."** Adhesive pastes and cements. Armstrong Cork Co., Lancaster, Pa.

514,035. **No-Crew.** Accessories for rubber machinery, etc. Mossberg Pressed Steel Corp., Attleboro, Mass.

514,040. **Sunoco.** Tire irons, mallets, and spreaders. Sun Oil Co., Philadelphia, Pa.

514,076. **Kilkseal.** Inflatable object valves. Forrester-Dorman Co., Flushing, N. Y.

514,109. Representation of a shoe machine on which are the words: **"Compo Adhesives make the better shoes."** Cement. Compo Shoe Machinery Corp., Boston, Mass.

514,113. **"Formula 21".** Insulating coatings softening. Aircraft-Marine Products, Inc., Harrisburg, Pa.

514,161. Representation of a circle cut by two arrows and a dotted line and the words: **"Perkins Glues"** and the letter: **"P."** Urea formaldehyde and phenol formaldehyde resins. Perkins Glue Co., Lansdale, Pa.

514,359. **Be Be Bond.** Cements. B. B. Chemical Co., Boston, Mass.

514,377. **Acolon.** Floor covering binder. Armstrong Cork Co., Lancaster, Pa.

514,389. **Little Student.** Footwear. Lane Bros. Co., Boston, Mass.

514,446. **Varsity.** Raincoats. Hart Schaffner & Marx, Chicago, Ill.

514,450. Representation of a circle on a ribbon containing an inner circle containing the word: **"Tauko."** Heels, taps, and soles. New Jersey Rubber Co., Taunton, Mass.

514,463. Representation of two curved arrows and the words: **"Gro Crepe."** Soles and heels. Gro-Cord Rubber Co., Lima, O.

514,512. **Stratford.** Footwear. William Hahn & Co., Washington, D. C.

514,592. **Happy Mediums.** Footwear. Miles Shoes Inc., New York, N. Y.

514,638. **Troy Debs.** Footwear. S. Troy, New York, N. Y.

514,816. Representation of an oval containing representation of a shield and the words: **"The General."** Storage batteries. General Tire & Rubber Co., Akron, O.

514,914. **"Plasti-Satin."** Shower curtains. House Beautiful Curtains, Inc., New York, N. Y.

514,995. **Super-Charged.** Golf balls. Worthington Ball Co., Elyria, O.

514,996. **Tuffball.** Golf balls. Worthington Ball Co., Elyria, O.

515,114. **Omniped.** Elastic foot cushions. International Foot Appliances, Ltd., London W. 1, England.

515,120. **Plisulate.** Heat insulating material. Plibrico Jointless Firebrick Co., Chicago, Ill.

515,145. **Voorhees.** Flooring. Voorhees Rubber Mfg. Co., Inc., New York, N. Y.

515,146. Representation of the letter: **"V"** containing the words: **"Voorhees Rubber Mfg. Co. Inc."** Flooring. Voorhees Rubber Mfg. Co., Inc., New York, N. Y.

515,155. Representation of a circle containing the letters: **"SR."** Adhesive plasters. Seamless Rubber Co., New Haven, Conn.

515,162. **Bismate.** Accelerators. R. T. Vanderbilt Co., Inc., New York, N. Y.

515,163. **"Tabform."** Accelerators. R. T. Vanderbilt Co., Inc., New York, N. Y.

515,208. **Prime-Pac.** Plastic film. Traver Corp., Chicago, Ill.

515,255. **Saphir.** Erasers and rubber bands. A. W. Faber-Castell Pencil Co., Inc., Newark, N. J.

515,258. **Hamlet.** Erasers and rubber bands. A. W. Faber-Castell Pencil Co., Inc., Newark, N. J.

515,269. **Swallow.** Raincoats. Swallow Raincoats, Ltd., Birmingham, England.

515,281. **Achor.** Rubberized thread. Clark Thread Co., Wilmington, Del.

515,282. Representation of an anchor. Rubberized thread. Clark Thread Co., Wilmington, Del.

515,388. Representation of a rectangle cut by a circle and containing the letters: **"RC."** Plastic aprons. R. C. Products Inc., Brooklyn, N. Y.

515,465. **Lord Carroll.** Raincoats. Plymouth Wholesale Dry Goods Corp., New York, N. Y.

515,475. **All American.** Mats. S. A. Kowalski, doing business as South Bend Fabric Mat Co., South Bend, Ind.

515,508. **Barbara Kaye.** Purses and handbags. Smart Handbag Co., St. Louis, Mo.

515,525. The word: **"Bridgeport"** superimposed upon the word: **"Fabrics."** Weather stripping. Bridgeport Fabrics, Inc., Bridgeport, Conn.

515,535. **Stalpic.** Resinous plastic coating or lining. Stalpic Coating Corp., Chicago, Ill.

515,591. Representation of a black cat. Heel strip material. Cat's Paw Rubber Co., Inc., Baltimore, Md.

515,598. **Tire Tred.** Heel top lifts. Essex Rubber Co., Trenton, N. J.

515,611. **Model-Weld.** Cement. Crag Products, Inc., Newark, N. J.

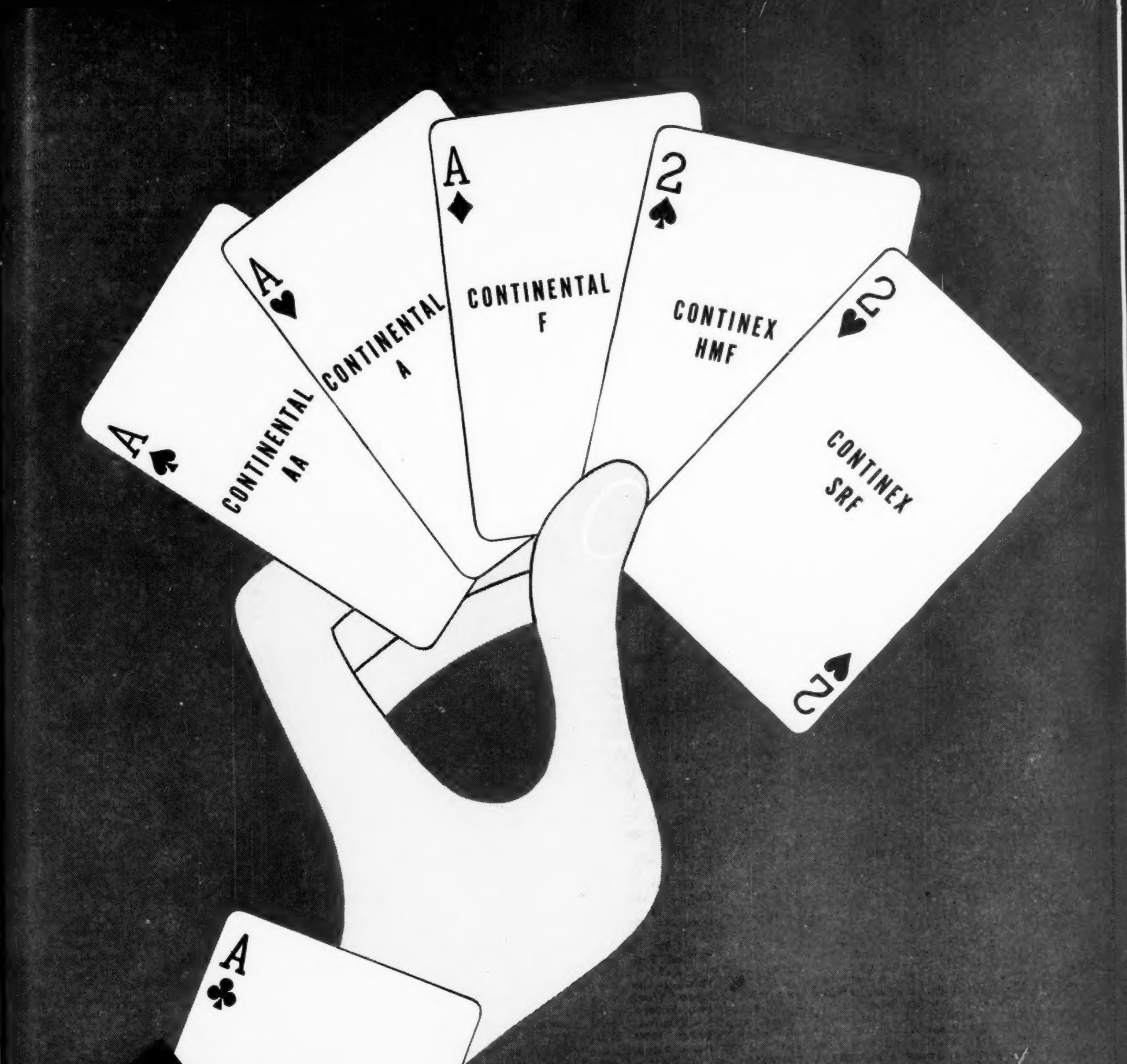
515,629. **Miller.** Rubber sundries. B. F. Goodrich Co., New York, N. Y.

515,687. **Covarnishblak.** Carbon black. Binney & Smith Co., New York, N. Y.

515,688. Representation of a shield cut by a strip containing the word: **"Homart."** Cement. Sears, Roebuck & Co., Chicago, Ill.

515,729. Representation of a winged foot and the word: **"Goodyear."** Lubricating and penetrating oil. Goodyear Tire & Rubber Co., Akron, O.

515,786. **H.S.R.** Dried synthetic resin and compounds. Hartman-Leddon Co., Inc., Philadelphia, Pa.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WITCO
Chemical Company
manufacturers and exporters
295 Madison Ave., N. Y. 17, N. Y.
WITCO
Los Angeles • Boston • Chicago • Detroit
Cleveland • San Francisco • Akron
London and Manchester, England

517,438. **Mil-O-Casing.** Artificial casings of rubber hydrochloride. Milprint, Inc., Milwaukee, Wis.

517,487. **Rocktemp.** Wire and cable. Rockbestos Products Corp., New Haven, Conn.

517,493. **Romex-T.** Wire and cable. General Cable Corp., New York, N. Y.

517,729. **Sunoco.** Tire paint. Sun Oil Co., Philadelphia, Pa.

517,741. **Roto-Flex.** Auto or truck chassis torsional bushings. Firestone Tire & Rubber Co., Akron, O.

517,875. Representation of a winged foot and the word: **"Goodyear."** Tire and rubber goods paint. Goodyear Tire & Rubber Co., Akron, O.

517,936. Representation of a military figure on which is an oval containing the word: **"Saco."** Raincoats. S. Abrahams & Co., Inc., Philadelphia, Pa.

517,939. **Saco.** Raincoats. S. Abrahams & Co., Inc., Philadelphia, Pa.

518,010. **Classic Mart.** Raincoats. Classic Mart Co., Philadelphia, Pa.

518,089. **Champion.** Tire grooving equipment. O. E. Thompson Sons, Ypsilanti, Mich.

518,103. **Trav-o-Flat.** Wheeled support for flat tires. National Tool & Die Co., Inc., Louisville, Ky.

518,179. **Acraplate.** Hydraulic presses. Lake Erie Engineering Corp., Buffalo, N. Y.

518,246. Representation of a fanciful design containing the representation of a workman and the words: **"Get it Dunn Safely, Use Dunn Products."** Protective clothing. E. D. Glick, doing business as Dunn Products, Chicago, Ill.

518,270. Representation of the globe containing the word: **"Caswell."** International miscellaneous merchandise brokerage service involving rubber goods, etc. Caswell Industrials Co., Inc., Washington, D. C.

518,328. **Pyrolex.** Latex impregnated paper. Joanna Western Mills Co., Chicago, Ill.

518,353. Representation of gears containing the letter: **"H."** V-belt machinery. Howe Machinery Co., Inc., Passaic, N. J.

518,357. **MacGregor.** Golf balls, tennis balls, etc. Sport Products, Inc., Cincinnati, O.

518,407. **Solarite.** Wire and cable insulation. Solar Compounds Corp., Linden, N. J.

518,423. **Faultless.** Baseballs, play balls, etc. Faultless Rubber Co., Ashland, O.

518,430. **Sno-Flex.** Insulated wire. Inland Electric Co., Spokane, Wash.

518,540. **All-Weather.** Storage batteries. Goodyear Tire & Rubber Co., Akron, O.

518,460. **Kooleez.** Crib sheets. International Latex Corp., Dover, Del.

518,470. **Lyncraft.** Pencils and erasers. Lyncraft Products Co., Inc., Chicago, Ill.

518,537. **Safety-Walk.** Non-skid coated sheet material. Minnesota Mining & Mfg. Co., St. Paul, Minn.

518,568. **Free-Flex.** Tire and tube repair units. Mohawk Rubber Co., Akron, O.

518,569. Representation of a top hat and cane and the word: **"McCarren's."** Raincoats. C. B. McCarren, doing business as McCarren's, Butler, Pa.

518,576. **Wiltrim.** Rubber article trimmer. H. E. Wills, doing business as Wills Rubber Trimming Machine Co., Canton, O.

518,578. Representation of a circle containing representation of a winged foot and the words: **"Goodyear Footwear Corporation Fleet Foot."** Footwear. Goodyear Footwear Corp., Providence, R. I.

518,579. Representation of a torch and concentric circles and the words: **"Speaker Quality."** Tire tube repair kits. J. W. Speaker Corp., Milwaukee, Wis.

518,581. Representation of wings containing the letter: **"W"** and the word: **"Moore's."** Tires, tubes, and brake linings. W. S. Moore, doing business as Moore's of Ohio, Newark, O.

518,548. **Speaker.** Tire and tube repair equipment. J. W. Speaker Corp. Milwaukee, Wis.

518,604. **Drihand.** Rubber gloves and mittens. Western Hosiery Co., Chicago, Ill.

518,612. Representation of wings containing representation of little boy in nightclothes carrying a tire. Tires. United States Rubber Co., New York, N. Y.

518,637. **Arcolite.** Footwear. Auburn Rubber Corp., Auburn, Ind.

518,711. **Birth-Right.** Footwear. Endicott Johnson Corp., Endicott, N. Y.

518,716. **Mayporite.** Compounding ingredients. F. B. Pope, doing business as Frank B. Pope Co., Pittsburgh, Pa.

518,717. **State-O-Maine.** Raincoats. Van Vaalen Heilbrun & Co., Inc., New York, N. Y.

518,720. **Chieftain.** Tires and tubes. Mohawk Rubber Co., Akron, O.

518,723. **Belleville.** Footwear. Belleville Shoe Mfg. Co., Belleville, Ill.

518,724. **Sport Lite.** Soles. Essex Rubber Co., Trenton, N. J.

518,725. **Realite.** Soles. Essex Rubber Co., Trenton, N. J.

518,733. Representation of a lined rectangle containing the letters: **"NCG."** Hose. National Cylinder Gas Co., Chicago, Ill.

518,737. **Carey.** Packings. Philip Carey Mfg. Co., Cincinnati, O.

518,740. **Hydrophen.** Resins. Reichhold Chemicals, Inc., Detroit, Mich.

518,751. **Air Nurse.** Inflatable mattresses for infants. International Latex Corp., Dover, Del.

518,752. **Nello.** Rosin. Glidden Co., Cleveland, O.

518,753. **Riddell.** Balls. John T. Riddell, Inc., Chicago, Ill.

518,803. Representation of a tire and the words: **" 'Pena-Tread' Treads-of-Steel."** Wire-tread tires. Pena-Tread, Inc., Marshfield, Wis.

518,817. Representation of a cross-section of a cup packing and the word: **"Periflex."** Cup packings. Platen Products Co., Detroit, Mich.

518,853. **Modern.** Tire changer. Cincinnati Equipment Sales Co., Cincinnati, O.

518,861. Representation of a rope formed into a rectangle and containing representation of a goat and the words: **"Tuff-Knit."** Raincoats. Harvard Clothing Co., Inc., Boston, Mass.

518,870. **NuWay Jusflush.** Waterproof panties. M. C. Renfro, doing business as Protective Merchandise, Whittier, Calif.

518,879. Representation of a circle cut by the word: **"Cabot,"** and the words: **"Godfrey L. Cabot, Inc., Boston, Mass., U.S.A."** Carbon black. Godfrey L. Cabot, Inc., Boston, Mass.

518,898. Representation of a shoe containing the word: **"Shugor."** Elastic fabrics. Thomas Taylor & Sons Inc., Hudson, Mass.

518,902. **Brown Label.** Liquid polish for coating floors of rubber, etc. S. C. Johnson & Son, Inc., Racine, Wis.

518,995. **Randfilm.** Dress shields. Rand Rubber Co., Inc., Brooklyn, N. Y.

519,014. **Arno.** Air meters for tires, etc. Romort Mfg. Co., Oakfield, Wis.

519,024. **Faultless.** Sponge rubber and rubber sponges. Faultless Rubber Co., Ashland, O.

519,028. **"Andal".** Elastic thread. Andrews-Alderfer Processing Co., Inc., Akron, O.

519,041. **Barden.** Kaolin clay. J. M. Huber Corp., Red Bank, N. J.

519,089. **Wonderball.** Golf balls. Worthington Ball Co., Elyria, O.

519,107. **Kleenster.** Window cleaning device. Garner & Co., New York, N. Y.

519,109. **Stayflex.** Elastic braids and webs. Continental Elastic Corp., New Bedford, Mass.

519,135. **Feather-Lite.** Hose. Sandee Mfg. Co., Chicago, Ill.

519,222. **Crawford.** Outdoor furniture rain covers. Crawford Mfg. Co., Inc., Richmond, Va.

519,328. **VisQueen.** Plastic film. Visking Corp., Chicago, Ill.

519,355. **Sheraton.** Abdominal supports and surgical stockings. C. H. Gebauer, Chicago, Ill.

519,396. **Inland.** Tire repairing equipment. Inland Rubber Corp., Chicago, Ill.

519,453. Representation of a label containing the words: **"Wolverine Shell Horse-Hide Work Shoes,"** and representations of two horses and two inner circles containing the words: **"Wolverine Shell Horse-Hide Wear 1000 Miles Stay Soft,"** and the representation of a shoe held between two hands. Footwear. Wolverine Shoe & Tanning Corp., Rockford, Mich.

519,473. **Tamborina.** Footwear. Daytimer Shoe Co., North Adams, Mass.

519,474. **G/A** Footwear. French, Shriner & Urner Mfg. Co., Boston, Mass.

519,476. **Gro Sport.** Soles and heels. Gro-Cord Rubber Co., Lima, O.

519,478. **Cathy Cupids.** Footwear. Hallowell Shoe Co., Hallowell, Me.

519,485. **Hollandia Kattex.** Raincoats. Hollandia Kattenburg, Inc., New York, N. Y.

519,512. **Face-Vue.** Packaging bags. Cellu-Craft Products Co., New York, N. Y.

519,514. Representation of a banner containing the words: **"Best Maid,"** and the representation of a maid. Wringer rolls. Appliance Parts Co., Cedar Falls, Iowa.

519,553. **Darex.** Balloons. Dewey & Almy Chemical Co., Cambridge, Mass.

519,561. Representation of a circle. Roll covers. Armstrong Cork Co., Manheim Township, Pa.

519,562. Representation of a boy and the words: **"Mark 'Andy"** and the numbers: **"8 10 21 9 16."** Tape. M. B. Andrews, doing business as the Mark Andrews Co., Kirkwood, Mo.

519,616. Representation an oval with an inner oval containing the word: **"Baldwin."** Mats. Baldwin Rubber Co., Pontiac, Mich.

519,618. **Mercury.** Printers' blankets. Rapid Roller Co., Chicago, Ill.

519,647. **Melflex.** Mats and stair treads. Melflex Products Co., Inc., Akron, O.

519,691. Representation of a fanciful figure containing the words:**"Sterling Brand Thomas Tyrer & Co."** Rubber industry chemicals. Thomas Tyrer & Co., Ltd., Stratford, England.

519,692. **Natur Nipple.** Animal suckling device. Mutual Products Co., Minneapolis, Minn.

519,698. **Monofilm.** Artificial leather. Textileather Corp., Toledo, O.

519,734. **Copeenblak.** Carbon black dispersed in polyethylene. Binney & Smith Co., New York, N. Y.

519,756. **Scotch-Weld.** Adhesive film. Minnesota Mining & Mfg. Co., St. Paul, Minn.

519,823. **Super-Stay.** Fibrous material impregnated with synthetic rubber for shoe manufacturers. M. A. Swartz, doing business as Atlantic Fabrics Co., Boston, Mass.

519,937. Representation of a cross-section of a pedal pad. Pedal pads. Anchor Rubber Products, Inc., Cleveland, O.

519,938. **Steelastic.** Pedal pads. Anchor Rubber Products, Inc., Cleveland, O.

520,035. Representation of a fanciful design containing representation of an acorn and the words: **"A I W Co. Acorn."** Wire and cable. Acorn Insulated Wire Co., Inc., Brooklyn, N. Y.

520,134. **Superior.** Antiskid chains. Peerless Chain Co., Winona, Minn.

520,146. **Dunlop.** Golf and tennis balls. Dunlop Tire & Rubber Corp., Buffalo, N. Y.

520,152. **Long Wear.** Golf balls. New Process Co., Warren, Pa.

520,160. Representation of a diamond containing the word: **"Bruxshu."** Footwear. Brooks Shoe Mfg. Co., Philadelphia, Pa.

520,175. **"Varick".** Surgeon's gloves, rubber sheeting, etc., Meinecke & Co., New York, N. Y.

520,177. **Shaf-tee.** Golf tees. R. W. Kerr Plastic Co., Hastings, Nebr.

520,185. Representation of a shield. Garters and suspenders. Hickok Mfg. Co., Inc., Rochester, N. Y.

520,200. **Rainvelope.** Raincoats. S. S. Pedlar, New York, N. Y.

520,207. **Spencer.** Footwear. Spencer Shoe Corp., Boston, Mass.

520,221. **Normal Tred Arch.** Footwear. P. C. Wolfer, Wellesley Hills, Mass.

Foreign Trade Opportunities

(Continued from page 576)

Gerrit Carel Pon, representing N. V. Ponnoplastic, Nijverheidsstraat, Amersfoort, Netherlands: plastics processing machinery.

Société des Anciens Etablissements Lavoine, 6 Rue St. Sauveur, Beaumont-le-Roger (Eure), France: transmission rubber and endless V-type rubber belting.

Indochina Tradeways Co., Inc., P. O. Box Higashi 140, Osaka, Japan: rubber and waste rubber.

Reencauchadora Internacional (Jimenez G. Racca Cia.), Armenia, Caldas, Colombia: camelback and vulcanizing materials.

Import Opportunities

Kuranishi & Trading Co., Ltd., P. O. Box No. 207, Osaka, Japan: electric wire and cable.

Universal Trading Co., Ltd., Osaka Central P. O. Box 378, Osaka, Japan: rubber goods, industrial dyestuffs, electrical goods.

Mitsuboshi Belting, Ltd., 4-chome, Hamazoe-Dori, Nagataku, Kobe, Japan: rubber belting.

Hiroshima Koeki Co., Ltd., No. 82 Room, Kyobunkan Bldg., No. 2, 4-chome, Ginza, Chuo-ku, Tokyo, Japan: rubber products.

Chemische Fabriek C. A. Verbunt N. V., Dongen, Netherlands: rubber cement.

Yoshida-Ichi & Co., Central P. O. Box 685, Tokyo, Japan: rubber goods (cycle tires, tile, shoes, hose).

Cheapside Rubber Co., Ltd., Junction Works, Carmichael Rd., London, S.E. 25, England: fishing waders.

Mitsuyu & Co., Ltd., No. 21, Kitakyutaro-Machi, 2-chome, Higashiku, Osaka, Japan: rubber products.

T. Okubo, 2256 Kichijoji, Musashinosi, Tokyo, Japan: rubber molding toys, inflated rubber animal toys, beach balls and footballs.

S. A. Pour la Fabrication d'Articles en Caoutchouc "Carideng," Lanaeken (Limbourg), Belgium: rubber articles such as tires, bicycle accessories, toys, playballs, hygienic goods, carpets, hose, heels.

The Lea Bridge Rubber Works, Ltd., Lea Bridge, London, E. 5, England: rubber goods such as toy and meteorological balloons, molded rubber toys, tobacco pouch linings, football bladders.

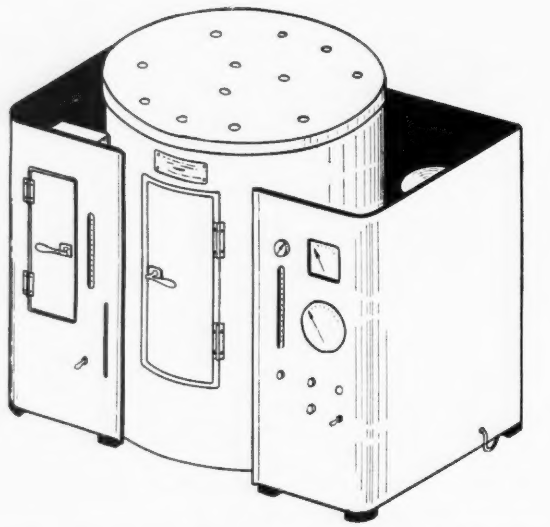
Howag, Ltd., Wohlen, Switzerland: telephone, instrument, plug, switch, and retractile cords.

Prima Industries, Ltd., Commercial St., Birmingham 1, England: bicycle, motorcycle, and car accessories.

Sanko Co., Ltd., 79, 4-chome, Jankweimachi, Minami-ku, Osaka, Japan: rubber products.

Asaoka Bussan Co., Ltd., No. 1 Nishinocho Unagidani, Minamiku, Osaka, Japan: rubber goods, plastic articles.

New Machines and Appliances



GFB-LGL Ozonator for Ozone Aging of Rubber and Rubber-Like Materials

Ozone Aging Tester

THE GFB-LGL Ozonator, an apparatus which generates and maintains a continuous flow of ozone under controlled conditions of pressure, temperature, and flow rate through a specimen exposure chamber, has been developed by G. F. Bush Associates, Princeton, N. J. Intended for use on rubber and rubber-like materials, the Ozonator can be used for ASTM tests and others which determine the relative resistance of these materials to cracking when exposed to air containing small concentrations of ozone.

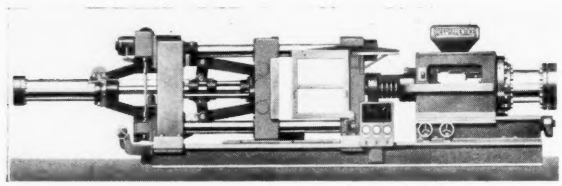
Design features include use of non-corrosive materials in the ozone circuit; non-leaking, low-pressure system for precision measurements; table model for compact operation; minimum temperature variation when specimens are inserted or removed; uniform temperature and ozone distribution in specimen chamber; rotating rack for test specimens; insulated exposure chamber; rear panel illumination of instruments; and quiet operation. Temperatures can be controlled up to 150±1° F.; ozone flow rate from 0-3 cubic meters per hour, ±2%; and ozone concentration from 0 to 30±2 parts per 100,000,000 parts air. The ozone measuring efficiency is specified at 99%. Except for extremely precise operation, the apparatus requires no correction for ozone absorption efficiency, action of light, and effect of pH of buffer solutions.

The tester operates on a 115-volt A.C., 60-cycle line. Overall dimensions are: width, 40 inches; depth, 27 inches; and height, 30 inches. The exposure chamber has a volume of six cubic feet, and the entire apparatus weighs 100 pounds. Partial equipment is supplied with the tester for the occasional checking of ozone concentration in the exposure chamber by means of chemical analysis.

Improved Injection Molding Machine

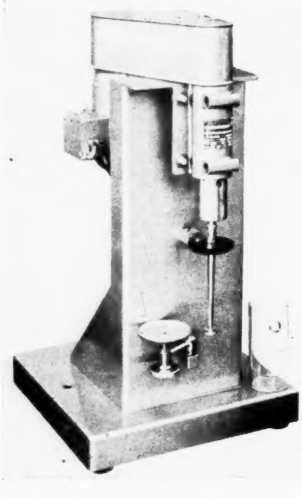
MAJOR improvements in its Model 10J-60-ounce injection molding machine have been announced by Reed-Prentice Corp., Worcester 4, Mass. Principal changes increase the molding capacity of this 60-ounce unit. The mold opening, formerly 24 inches, was increased to 36 inches, and the casting area is now rated at 350 square inches, compared with the 210 square inches previously specified.

A newly designed timing panel automatically controls the die plate and plunger; while convenient push buttons control adjustment of mold and heating cylinder. Manual operation is instantly obtainable at any time. The large-capacity heating cylinder, housing a copper core spreader, assures rapid plasticizing of 250 pounds of molding powder an hour, it is also claimed. A new wedge-type clamping device holds the heater securely and permits easy mounting and removal. All piping, electrical controls, and hydraulic equipment are mounted outside the base of the machine for greater accessibility. The machine alone is 381 inches long, 90 inches wide, and 92 inches high and weighs 96,000 pounds.



Improved Reed-Prentice Model 10J-60 Ounce Injection Molder

Latex Stability Tester



Precision Mechanical Stability Latex Test Apparatus

THE Precision mechanical stability latex test apparatus, designed in cooperation with Firestone Tire & Rubber Co. and ASTM Committee D-11 Subcommittee VII, has been announced by Precision Scientific Co., Chicago, Ill. The unit provides a standard apparatus for determining the mechanical stability of concentrated natural latices using a high-speed stirring technique as described by H. G. Dawson.[1]

The apparatus consists of a vertical shaft high-speed stirrer capable of maintaining a speed of 14,000 r.p.m. for the duration of the test. The agitator consists of a highly polished stainless steel disk equipped with a threaded stud for attaching to the spindle shaft. The test jar is of pyrex glass with flat bottom and ground top and has a side hole for sampling purposes. A holder is provided for convenient insertion of the jar.

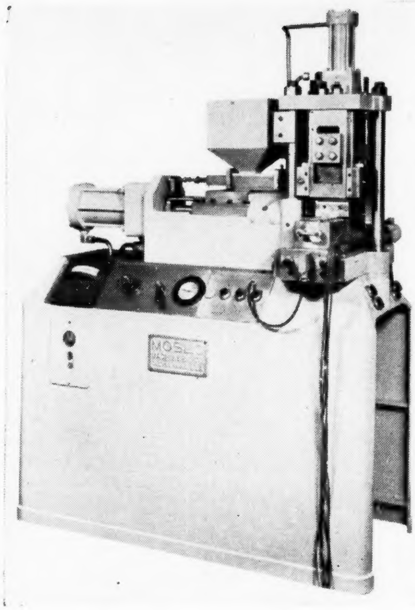
The spindle is driven by a ½ h.p., 3,450 r.p.m. induction motor carefully balanced and alined to hold vibration to a minimum. The drive system between the motor and spindle is sturdily built on a steel frame and finished in green hammerloid.

[1] *Anal. Chem.*, 21, 1066 (1949).

New Injection Molder

THE Duplimatic injection molder, designed for speedy production of molded plastic electrical parts with inserts of all shapes and sizes, has been announced by Moslo Machinery Co., Cleveland 15, O. Successful installations already in use show that the machine is adaptable at low cost to high-speed production of such items as molded cord plugs, switch parts, instrument parts, and the like.

The machine differs from ordinary injection molders in the use of a two-sided self-positioning lower mold section. One half of the mold can be cleared and reloaded while the other half is engaged in the molding cycle. A single operator handles the loading, cycling, and unloading on insert work formerly requiring extra hands. The Duplimatic is made with a hydraulically operated rapid traverse bed. The lower mold section, twice the size of the upper, has a complete duplicate set of cavities and is mounted on the automatic positioning bed. In starting, one half of the lower mold section is exposed for ready access by the

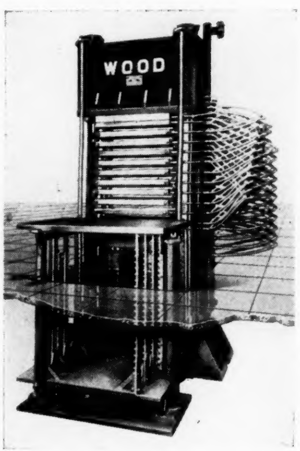


Moslo Duplimatic Injection Molder

operator who can quickly load the insert parts in the idle set of cavities. As soon as the inserts are placed and locked into position, the operator presses two control buttons which shift the mold and set the automatic cycle in action. While this cycle is under way, the operator unloads the other half of the mold, which is now accessible, and reloads these cavities. Injection and curing of each half of the mold is completed by the time all inserts are in position in the idle mold half, and the next cycle is started immediately.

Other features of the machine include a torpedo-less stainless steel injection cylinder with even-heating characteristics, toggle and wedge mechanical clamping to prevent flashing, and finger-tip control of all details. The machines are made in two-, three-, and four-ounce capacities, with casting areas from 20-40 square inches; while larger machines are available on special order.

Plastic Sheet Press

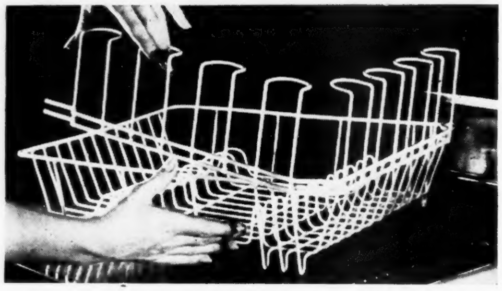


Plastic Sheet Polishing and Laminating Press

A FULLY automatic 880-ton, 10-opening hydraulic platen press for the precision polishing and laminating of plastic sheets has been announced by R. D. Wood Co., Public Ledger Bldg., Philadelphia 5, Pa. The complete sheet production unit includes the press, a 20-opening elevator that permits loading and unloading with a minimum of press-idle time, a two-pressure pumping unit for press and elevator operation, and a fully automatic valve control system that provides adjustable control of the press operating cycle, pressure application, and platen temperature regulation.

The press operating cycle, with the pressure application, blow-down, and heating and cooling phases, is completely controlled from a centralized panel board through adjustment of time-pressure and time-temperaure controllers. Absolute assurance of repetitive production of exactly uniform sheets 0.003-0.750-inch thick, precise as to thickness, flexibility, and coloring, is maintained, it is further claimed. The heating platens are 44 by 54 inches in size, and the press can be built in a wide range of sizes for varying pressures.

New Goods and Specialties



Vinylite Coated Dish Drainer with Glass-Draining Attachment

New Dish Drainer Utilizes Vinylite

A NEW type of dish drainer that has the added feature of an attachment for draining eight glasses or cups is being marketed by Artistic Wire Products Co., Inc., East Hampton, Minn. The drainer is constructed of wire coated with durable Vinylite vinyl resin made by Bakelite Division, Union Carbide & Carbon Corp., New York, N. Y. The new kitchen aid is larger than conventional drainers, being 16¾ inches long, 13½ inches wide, and 7¼ inches high, and has 12 plate holders and an extra space between the plates and flatware section. The Vinylite coating not only outlasts conventional finishes, it is said, but also provides a heavy cushion against breakage of dishes and glassware in addition to being resistant to hot water, grease, soaps, detergents, and abrasion.

Kitchen Shelf Mats and Cup Racks

RUBBERMAID Shelf-Kushions, rubber mats for kitchen shelves that are colorful, durable, and easy to clean, have been introduced by Wooster Rubber Co., Wooster, O. The new mats come in a variety of colors, including red, blue, green, yellow, and marbleized black, and in a choice of sizes to fit all standard kitchen-wall cabinets. The mats protect shelf surfaces, reduce kitchen clatter, reduce damage to china and glassware, keep shelves clean, and lend a cheerful color to the kitchen, the manufacturer claims.

The Shelf-Kushions are available in standard 11¾-inch width, and sets of three in 24-, 30-, and 36-inch lengths. The sets come in cellophane packages designed for self-display and sales appeal. A ribbed under-surface holds the mat firmly in place; while

Rubbermaid "Shelf-Kushions" Made by the Wooster Rubber Co.

molded plate rails provide safety footing for plates, and raised surface ribs hold glassware up, promote thorough drying, and prevent fogging. Like the company's other Rubbermaid products, the Shelf-Kushions are said to be colorful, colorfast, odorless, and resistant to heat, scalding water, grease, soap, cleansers, and kitchen acids.

Wooster has also marketed a new Rubbermaid cup-and-saucer rack that saves shelf space, reduces breakage and chipping, tones down kitchen noise, facilitates storing of cups and saucers, and adds color to the kitchen. The new rack is made of durable wire with a special rubber coating that does not peel off or soften in scalding water, grease, or soap, it is also claimed. Available in red, white, and yellow, the rack is made in two sizes: the larger holds eight cups and saucers, while the smaller holds eight cups only.

Improved Rubber Wading Pool for Children

U. S. Rubber's "Rigid-Aire" Wading Pool

A NEW rubber wading pool for children, designed for longer wear and increased safety, is being produced by United States Rubber Co., Rockefeller Center, New York 20, N. Y. Called the U. S. Royal "Rigid-Aire," the pool is large in capacity, light in weight, and made by a new method that gives firm side walls 10 inches high that do not collapse when children sit on them.

The walls of the pool are made of two layers of cotton fabric connected by thousands of threads, and the space between the fabric layers becomes the inflation chamber. Neoprene coating of the fabric adds resistance to sun, air, and sun tan oil. A rough finish on the floor prevents slipping; while for maximum safety the only metal part is a protected inflation valve.

The pool can be inflated with a hand tire pump in three minutes, and deflated as quickly. This pool weighs 13½ pounds and can be folded compactly for carrying. It has red walls and a green floor, is 54 inches in overall diameter, and has a water capacity of 98 gallons. It will accommodate four children comfortably and, when turned upside down can be used by older children and adults as a raft.

U. S. Rubber is also producing a smaller pool of all-rubber construction and shaped like an automobile inner tube. This pool has a tubular inflation chamber eight inches in diameter, has a 54-inch outside diameter, a water capacity of 45 gallons, and weighs 7¾ pounds. Easy to deflate and inflate, and having no exposed metal parts, the smaller pool has a bright yellow tube and a green floor with a stencil pattern.

EUROPE

NETHERLANDS

Visit to Rubber Stichting

L. THACKER
Foreign News Editor

DELFT, MAY 19: The Rubber Stichting premises, including grounds, which that organization shares with the Plastics Institute and one or two other research organizations occupy about one city block. The Rubber Stichting itself is housed in the right wing of a handsome building situated in the outskirts of Delft.

When you approach an American plant, factory, office, or government building where many people are employed, the first thing you notice is the number of automobiles parked in front; when you enter the Rubber Stichting you are struck by the tangle of bicycles leaning against walls and each other. It would be true to say that among the distinguishing features of Holland, as characteristic as its windmills and canals, are the bicycles.

At the Rubber Stichting a young Hollander, Blaupot ten Cate, was delegated to conduct me around the building. We started with the lecture room and saw the adjoining film room. Later in the afternoon I had the opportunity of seeing a film showing the manufacture of rubber footwear at the Vredestein plant. We next passed into the sample room where all kinds of rubber goods, some produced in Holland, others of French, British, or Belgian manufacture, were ranged on shelves. There were articles whose possibilities have been or are being investigated by the Stichting. I noticed some soles made in France of heat-sensitized latex which Mr. ten Cate said are so durable that they outwear the uppers to which they are attached. Rubber goods, the manufacture and consumption of which the Stichting wishes to promote, are shown in a series of glass-fronted cases along the sides of the wide corridors—forming the permanent exhibition here. On the lower floors were most of the physical and chemical laboratories, the workshops, the glass blowing shop, finally also the factory.

Mention has already been made in previous issues of India RUBBER WORLD of the Rupal cement-flooring mixtures, and Elastoleum rubber floor covering, which have been developed at the Stichting and are now being produced on a commercial scale, as well as of Rulahyd, the new hydrochlorinated latex from which films of the Pliofilm type have been successfully produced. Work to improve Rulahyd and extend its application is continuing, and new uses for latex-cement mixtures are also being studied. At present the Stichting seems to be most interested in the possibilities of the flow-casting process for latex, whereby suitably compounded latex containing curing agents is poured into a plaster mold made in one or more sections. A rubber skin immediately forms on the plaster wall, and water and the non-rubbers in solution are absorbed by the plaster. Successive amounts of latex mix are added until the desired wall-thickness is obtained. Then the surplus latex is poured off, for reuse. The mold and the rubber are dried about one-half an hour at 100° C., when the rubber is firm enough to be removed, and the object cured. I was shown toys and other articles made by this process, including some heavily loaded with chalk (up to 300 parts on 100 of rubber). The latter were rather hard, but not brittle, and Mr. ten Cate could throw them on the factory floor without breaking them. Some of the objects were colored by pigment included in the mix, but suitably pigmented coatings can also be applied externally. Preflocculated latex has also been tested in this process and in some cases proved of advantage, but the usual method is better suited for the production of toys and larger articles.

In connection with the work on rubber in roads, the Stichting recently started a new asphalt laboratory in which practically any type of investigation can be carried out.

On one of the upper floors, in a small room with good exposure to light and sun, a new type of wall coating was being tested. The material, "Cellaplast," manufactured and marketed by the Nederlandsche Fabriek van "Cella" Produkten, N.V., Amsterdam, consists of a mixture of latex and other substances and can be applied to practically any surface. It comes in two forms—a paste for spreading and a liquid for applying by spray gun—and provides an attractive surface that the manufacturer claims is washable, fast to sunlight, and very durable.

The Stichting is now giving technical and scientific advice to the N. V. Helmitin of Waalwyk in producing Positex and vulcanized latex. This firm will also prepare latex mixes for use in flow casting. With reference to Positex, Mr. ten Cate mentioned that various precautions are necessary, for instance the fiber must be freed of fats and oils and care must be taken to use the right soap and to avoid hard water; otherwise all kinds of complications may arise.

The Stichting has also in collaboration with the Keramisch Instituut T. N. O., Gouda, started to investigate the use of latex in ceramics.

Dr. R. Houwink, director of the Stichting, in an interview in his office, told me about the propaganda work of the Stichting and was particularly enthusiastic over the traveling demonstration car, used in connection with lectures and courses to explain to interested persons all over Holland the uses of rubber with the aid of films, display cards, and actual exhibits. The great need is for more films Dr. Houwink said; some have already been provided, among the rest by American companies, but many more could be used. Incidentally, the Stichting, which has comparatively recently established a branch in Belgium, is to extend its activities to Switzerland and Sweden.

The Stichting is to move into its own building before long, and Dr. Houwink had a model brought out to give me an idea of what the new premises will look like. The front will be occupied by the main building, for offices, lecture rooms, library, etc. It will be connected by a single narrow structure to three rather long, low buildings in the rear which are to house laboratories and workshops.

Dr. Houwink will be one of the three Dutch delegates to the international meeting of the Division of Rubber Chemistry, A. C. S., in Cleveland, O., in October, and will speak on the reinforcement of high polymers, especially rubber; Dr. de Decker, director of the research department of the Rubber Stichting, will speak on rubber derivatives; and Dr. Boonstra, Rubber Research Institute of Delft, will discuss physical testing.

In an interview with Dr. Boonstra, I was able to view briefly the physical testing laboratory where special emphasis was directed toward an apparatus for measuring the heat build-up of natural and synthetic rubbers under stress.

The Dutch Rubber Industry

L. THACKER

THE HAGUE, MAY 30: Through Mr. Forbes, of the Rubber Stichting, I was able to arrange a meeting with Mr. Belgrave, president of the Netherlands Rubber Manufacturers' Association, in The Hague. Mr. Belgrave explained that the rubber goods manufacturing industry in Holland is still on a small scale and includes about 40 factories of which the two largest (Vredestein and Hevea) have about 2,000 employes each, and the smallest factories about 30 each, with the total number of persons employed in the industry numbering something like 8,000. There are in addition about 45 retreading and tire repairing establishments.

Consumption of rubber in 1950 in Holland is expected to show an increase, especially of latex. Mr. Belgrave said manufacturers used some 500 tons of latex in 1949, and it was very likely that this figure would be doubled in 1951. Consumption of dry rubber in 1950 he estimated at 13,000 tons, as compared with 12,000 tons in 1949. Domestic production takes care of the demand for most rubber goods except certain special tires, mechanical and surgical goods. Since the Vredestein-Goodrich automobile tire factory has begun to operate, the demand for these goods, formerly only partly satisfied by the Holland branch of the Michelin concern, may be expected to be filled with a surplus left for export.

The Vredestein company operates three plants, including the above-mentioned tire factory, and produces all kinds of goods, among them foamed latex products. The Michelin branch here, which employs 500 to 600 persons, manufactures tires exclusively. Since the end of the war there has been notable activity among manufacturers in the use of latex for making foamed rubber and other products, largely, I should say, as the result of the efforts of the Rubber Stichting. Indeed there seems to be such interest in the manufacture of foamed rubber that it has been considered advisable to take steps to insure a proper standard of quality, and the Rubber Research Institute, with the cooperation of the Rubber Stichting and the approval of the Netherlands RMA, plans to form a council which will set up standards and provide test samples.

The need of standards of quality for all types of goods made direct from latex seems to be particularly necessary in view of the relatively low cost of equipping small factories and the simplicity of the methods used. In this connection my attention was attracted by an article in *Le Latex*, a special publication of the Institut Français du Caoutchouc, entitled "Some Economic and Financial Data on the Latex Industry," by G. E. Rotgans, economic consultant of the Rubber Stichting. Mr. Rotgans begins by comparing the development in the use

of latex with that of bulk rubber, showing how much more rapid this was in the case of the former. The price of latex, he points out, is now about 50% above that of bulk rubber, but with the increase in the output of latex the premium over bulk rubber is bound to decrease and should not be above 20%, he finds. The various applications of latex are next discussed—foamed latex, dipped goods, sheet, molded goods, thread, adhesives, etc.—with special emphasis on the cost of production and selling prices and the capital required for starting small factories. In general, a production capacity of one ton in the latex industry requires only one-third, or even as little as one-fourth the capital needed for the manufacture of goods from bulk rubber.

The cost of machines and equipment for a factory for treating 800 gallons of latex for foamed rubber daily would require not more than the equivalent of a little more than $10,000 in Holland; for making dipped goods, a small factory with four workers (only one of them a specialist), a capital of about $2,000 is necessary. Even less, about $1,600 is enough to start a small factory for making molded latex goods, such as soles, heels, and the like, by the I. F. C. method using heat-sensitized latex. For the installation and equipment of a factory, with three machines, for making rubber thread from latex, about $93,000 is needed.

Mr. Belgrave told me that rubber goods manufacturers here use between 200 and 300 tons of neoprene, GR-S, and nitrile type rubbers a year; polyvinyl chloride is also being used, among other applications for the manufacture of artificial leather, and both PVC and polyethylene find a place in the production of cables.

Questioned on the subject of the liberalization of European trade, Mr. Belgrave stated that rubber manufacturers in Holland had at first welcomed the step, but have since found that the low Dutch tariff is rather a disadvantage in negotiations with countries having much higher import duties. He cited a particularly marked instance of this kind of disparity: the tariff to which a certain type of Netherlands hose is subject on entry into Germany is about 106%, while the tariff the same kind of German hose has to pay on coming into the Netherlands is only 12%. Almost immediately after the liberalization of trade, he added, German manufacturers in the Western Zone began to put automobile tires on the Dutch market at prices justifying the use of the term "dumping" in this connection.

Plastics in Holland

L. THACKER

The Hague, May 21. The Rubber Stichting also arranged for an interview in The Hague with Dr. Wildschut, of Bataafsche Petroleum Mij. One of the first subjects on which I asked information was the progress of the work on the new fiber from natural rubber which had been reported as being cheaper to produce than nylon and better than that material. Dr. Wildschut could not tell me much since the development is still in an experimental stage, but he did mention that the fiber is made from rubber reacted with sulfur dioxide, and the filament may be spun into a yarn. It is a general-purpose fiber which compares more closely with viscose and acetate rayon than with nylon, he said, and has the chemical resistance and tensile properties similar to these rayons.

He told me that the PVC plant of Bataafsche Petroleum at Rotterdam has just started to produce; the capacity of the plant is 1,600 tons a year, but it is not expected to be able to attain this figure until 1951. I understand the B. P. M. is the only Dutch firm producing PVC. Previously this plastic had to be imported, and I was interested to learn that one of the sources was a Swedish firm, the Superfosfat company of Stockholm, which produces and markets PVC under the name Pevikon. Dr. Wildschut remarked on the fact that so many countries in Europe were taking up the production of plastics, especially PVC.

In Holland the number of firms using plastics has been increasing rapidly, and a committee for standardizing the quality of plastic goods, of which Dr. Wildschut is chairman, has recently been formed, and is working with the Government Central Normalization Bureau.

Among the companies using plastics and manufacturing plastics articles, I note in the first place the Draka, Hollandsche Draad en Kabelfabriek, Amsterdam. Draka has just celebrated the fortieth year of its existence, I learned from an article in *Plastica*, the organ of the Plastics Institute of Delft. The company, which now has a capital of 7,000,000 guilders, almost wholly paid up, first became known as a manufacturer of rubber insulated wires and cables. Later it began to use plastics and claims to be the first Dutch concern to extrude PVC, which it began in 1935, using a German product. After the war the company sent specialists to the United States to study the use

of plastics there, and it also maintained relations with British concerns and is said to have one of the most up-to-date plastic plants in Europe. The company's products include Draka vinyl cloth, vinyl coated paper for book covers and the like, Draka Vita PVC for lining and covering tubes and pipes for the chemical industry, cellular PVC, polyethylene foils, Draka vinyline solutions, hard vinyl for tank linings, also Draka "shrink plastic," as it is called; this is a PVC compound which shrinks to about half its original dimensions, when heated, and is used for lining and covering tubing and objects of irregular contours, for making metal pipes and other parts chemically resistant, and also for covering metal furniture, steering wheels of automobiles, etc.

Draka recently secured from the Dow Chemical Co. the rights to make Saran products in the Benelux countries. Incidentally, the manufacture of Saran thread, as well as of various PVC products, has been made possible through the ECA, with whose aid the necessary machinery could be acquired. Polyethylene is used by the company in the production of electrical parts, tubing for use in the chemical, beer and food industries, and for wrapping material; cellulose acetate and aceto butyrate for gas tubing and linings.

N. V. Pope's Draad en Lampenfabriek manufactures insulations and tubing of PVC. I understand this company is affiliated with N. V. Philips Gloeilampenfabriek; other companies employing PVC for similar purposes are Invico, of Weerdt (rods and tubes); and Polva Nederland, of Oosterbeek (pipes and tubing). Plastics Plaatwellerij, in Velsen, makes PVC linings for chemical apparatus; Plastics Unie, Arnhem, and Veritex, of Nieuw Millingen, make supported PVC artificial leather; the former also makes unsupported PVC gaskets, belting, and the like. The International Kunstoffindustries has just begun to make polyethylene films. Adriaan Honig's Kunstharsindustrie, Zaandam, produces phthalate and urea resins, among the rest.

Delft, May 30. In order to get some information on the scientific and technical side of the development of plastics in Holland, I made another trip to Delft, to visit the Plastics Institute. I was very kindly received by F. V. R. Wybrans, and later by A. J. Staverman. Dr. Wybrans was able to amplify some of the data on plastics concerns given me by Dr. Wildschut. The former conducted me through the laboratories and shops and took me through the testing rooms. In one, tensile tests on Lucite were being carried out on a large complicated-looking machine of American make. There were other mechanical testing devices of both American and European make, and I asked Dr. Wybrans which he preferred. Pointing to a Martens (German) oven-like apparatus for measuring heat distortion, Dr. Wybrans said that he preferred it to the ASTM device (in which the sample is submerged in oil) because the Martens apparatus was more reliable. Similarly he found that the German Dynstat apparatus for testing impact resistance had an advantage over the American device because it permitted the use of smaller test pieces. Apparently Continental investigators find some advantage in the use of very small test pieces.

I was then shown a device for measuring the scratch resistance of rigid plastics which had been adapted at the Plastics Institute from devices used in other industries. In this apparatus a hard, granular material is poured into a hopper on top of a chute-like structure. The material slides rapidly down the chute on to a sample of plastics on a platform below. Later a piece of the sample is placed into another apparatus, and the scattering of a beam of light by virtue of the abrasions on the plastic serves to indicate the scratch resistance of the sample.

Dr. Staverman showed me some transparent films similar to cellophane which were made from a derivative of potato starch—the first to be successfully produced, on a laboratory scale, from this material. He explained that potato starch contains amylose and amylopectin, that the two are not compatible, that by removing the amylose from the starch its properties for use as a dressing (in the textile industry, for instance) were greatly improved, while at the same time the amylose could be used in the production of films. Of course this work is still in a very early stage of development, and the success of the process will depend on the cost of separating the substances on a commercial scale.

The Institute is also experimenting with proteins and in this connection has been studying the proteins contained in the seeds of lupines. Dr. Staverman showed me the laboratory where tests were being conducted in spinning a thread from a solution of these proteins. This work is also in a very early stage, and it seemed to me to require a great deal of patience and very delicate handling to produce a continuous thread, which is probably the reason why this part of the job was entrusted to women investigators. A thin, continuous, white, rather jelly-like strand was being produced, which I was told would alternately be dried and stretched until a fine fiber was obtained. Lupines are abundant; they are grown in Holland as a leguminous cover to improve the soil, and the seed is cheap; it is hoped to be able to obtain a fiber to replace artificial wool fibers made from casein.

YUGOSLAVIA

The Yugovinil factory near Split has started operations and is expected to produce 5,000 metric tons of plastics annually.

It is also learned that trial runs have been started at the newly completed Pecina carbon black plant near Bakar. It is hoped that the eventual output from this plant together with that from the factory at Kuntina will suffice to cover domestic needs of carbon black.

Under a recent trade agreement Netherlands will supply Yugoslavia with rubber.

According to a recent press report, Yugoslavian tire factories now can manufacture on an adequate scale aircraft tires for various types of planes. Hitherto all such tires had to be imported.

FAR EAST

INDONESIA

For Better Natural Rubber

The problem of improving the quality of natural rubber has become one of great urgency to rubber producers in the Far East in view of the competition from synthetic rubber. In June, 1949, the Association of Owners of Rubber Estates in Indonesia formed a Committee for Uniform Rubber which presented two reports, on short- and long-range improvement of rubber, respectively, at a meeting of members of the Rubberbond held at Jacarta (Batavia) the following August.

When summaries of these papers were offered by the Indonesian delegation at a meeting in September in Kuala Lumpur, Malaya, by the Rubber Research Institute of Malaya, which was attended by representatives of the chief rubber growing countries in the Far East, the papers aroused such interest that it was decided to publish translations of the full reports in a special English issue of the *Archief voor de Rubbercultuur*.[1]

The first article, "Steps toward Uniform Natural Rubber," by J. Schweizer, lists the members of the Committee as: Chairman, Dr. Schweizer, general director of the experiment station of the C.P.V. (Central Association of Experiment Stations for Perennial Cultures in Indonesia); G. Verhaar, director of the central chemical-technical division of the C.P.V. experiment station; G. J. Van der Bie, director of Indonesia Institute for Rubber Research; H. van Lennep, director of government estates; A. J. de Leeuw, acting vice-director of government estates; H. R. Braak, acting technological adviser to government estates; K. F. R. Jansen, director of "Rubberfonds"; J. A. Backer, Chairman, Organization Exporters of Indonesian Produce; R. A. Lumsdale, technical adviser to the Estates Agriculture Section of the Department of Agriculture and Fisheries.

The Committee is divided into two teams, of which Team A, under the chairmanship of Dr. Verhaar, is devoted to short-term improvement of rubber; while Team B, under Dr. van der Bie, takes up the long-term problems.

Under the head, "The Manufacture of Clean and Uniform Rubber on Estates," Dr. Verhaar introduces the discussion of measures for improving quality by aiming at a clean and uniform product without making drastic changes in the existing system of producing rubber.

The question is treated in detail in "Better Rubber at Short Notice," the Advisory memorandum of Team A. It is shown that complaints, chiefly from the United States relate mainly to quality and packing, and careful adherence is recommended to the rules given in the "Manual for the Preparation of Rubber," issued in 1949 by the Central Chemical-Technical Division of the C.P.V. Experiment Station in collaboration with the A.V.R.O.S. Experiment Station. A manual of this kind had been put out in 1938, but disappeared during the Japanese occupation, and only a few copies of an edition printed in America in 1943 reached the Estates. The 1949 issue is a completely revised edition of the older manual. At the same time it is recognized that under present political conditions the planter suffers from causes beyond his control, chief among which is prob-

[1] Dec., 1949, p. 303.

ably terrorism and resulting shortage of labor. On the other hand, many estates would be faced with the necessity of making new investments to improve factories and provide suitable equipment for the production of a superior article.

Uniform packing, coating, and marking of rubber bales are recommended; bales for sheet to be 19 by 19 by 24 inches and to weigh 113 kilograms (kg. equals 2.2 lbs.); crepe in packs weighing 80 to 85 kilograms per five cubic feet. For the time being retaining the usual method of sampling on estates before baling is recommended.

In his article, "Some Directives and Views on the Centralized Preparation of Rubber," Dr. Braak emphasizes that while the idea of centralized rubber preparation is not new, the reasons for the proposals are not the same. The present suggestion stems from the conviction that only factories of sufficiently large size and able to employ properly trained technical personnel will be able to raise the preparation of natural rubber to a level permitting competition on an equal footing with synthetic rubber—in short, it is only by transforming the preparation of natural rubber into a chemical industry that it will be possible to make a stand against synthetic rubber.

It is recognized that it is impossible to supply uniform rubber at all times and in all places; therefore the aim will be to produce enough large lots of rubber in a limited number of assortments, by a combination of bulking latex and grading according to intrinsic properties. The raw material accepted at a central plant will include latex, pretreated latex, flocculated rubber and coagulum; in the case of native rubber it is not feasible to accept anything besides usable latex. It is estimated that in areas within a radius of 30 kilometers of a central plant the costs of transportation and preservation of latex would not be more than about five guilder cents per kilogram of dry rubber, and a large part of these costs is expected to be canceled by savings possible through centralization.

At the outset Dr. Braak would give preference to centralized manufacture of crepe, first because for this purpose (unlike sheet) there is no need to work up the latex immediately, and then because crepe manufacture is more difficult, and producers would have to make good use of available technical knowledge and thus pave the way for centralized production of more complicated forms, including Mealorub and concentrated latex.

Schweizer on *Hevea* Latex

In the introductory remarks of his article "*Hevea* Latex as a Biological Substance," (the last in the issue of *Archief* under discussion), Dr. Schweizer says that if natural rubber is to be improved, the first essential is to have a thorough knowledge of the composition and physiology of latex, and in his opinion, only research work carried out in cooperation by the entire rubber producing world will provide any possibility of successfully resisting the threat of synthetic rubber.

The lengthy article is divided into three main parts: cause of the variability in the composition of latices; formation of rubber; formation of rubber after tapping.

Variability is chiefly caused by the constituents in the serum of the latex, which in turn depends on the type and the age of the tree, the soil, climate, season, tapping system, method of

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preparation. But other factors also affect the composition of latex. The latex that flows into the cups afer tapping differs in composition from that in the latex vessels of the tree; and the latex in the young vessels near the cambium has a different composition from that of the latex in older vessels farther from the center; while their rate of flow is different. During tapping these latices flow together, resulting in differences in the composition of the different fractions from an individual tree. The heterodispersion of the latex, especially of the first fraction, is still further increased by contact with the sap (containing albumen, sugars, enzymes, etc.) released by severing the sieve tubes during tapping.

The findings in connection with the changes in composition of latex, when it flows out have led Dr. Schweizer to abandon his earlier views on its metabolic food function.

Regarding the so-called lutoids or yellow fraction of latex (Haan-Homans and Van Gils), it is suggested that they may originate from plasma from the sieve tubes in the first place and also from the latex vessels during tapping, and future experiments will have to determine if there is any connection between the regeneration of latex and lutoid content.

Under the heads, "Formation of Rubber" and "Formation of Rubber after Tapping," Dr. Schweizer chiefly elaborates his views on the relation of growth and the formation of rubber. Without growth, he says, no rubber formation.

He shows that tapping retards the growth of trees. In a certain experiment carried out over a period of five years, the growth of trees yielding three to four kilograms per tree per annum was found to be 1/3 less than that of comparable untapped trees; while in the case of heavily tapped trees, averaging 5 kilograms per tree per annum, the adverse difference in growth was as much as 50%, and the first cases of Brown Bast were observed. He concludes from this point that *Hevea* regenerates the irreversible excretion rubber, at the expense of its assimilation products so that the formation of rubber may be considered as the equivalent of a growth process in which all parts of the tree cooperate more or less.

Developing the theory that the whole tree participates in the regeneration process, Schweizer points to the new light in which it places problems of tapping and selection. As early as 1941 he had called attention to trees and clones which, when tapped high up on the stem or in the crown, produced as much and more latex as when tapped in the normal way. Consequently, he urges, to judge clones and potential mother trees, they should be tested for their "flow area" because this determines their regenerative power. Here, of course, the health of roots, trunks, and more especially of crowns plays an important part.

Brown Bast, drying up, excessive flowing of latex for an abnormally long period after tapping, he says, are all physiological consequences of the competition by growth on the one hand and latex production on the other for the available assimilation products. The abnormal degree of dilution observed in Brown Bast is caused by the breakdown of the assimilation process, leading to exhaustion and death of cells.

Earlier in his discussion Dr. Schweizer showed that the latex of all young growing tissues always contain very small, round rubber particles, under 0.5 Mu, and he suggests that the larger, older latex particles are therefore probably formed from the submicroscopic elements (isoprene molecules of varying degree of polymerization) by fusion, just as in the case of synthetic latex (polymerization). Theoretically, therefore, he concludes, it should be possible to influence the form and the structure of the rubber molecule in the plant itself.

MALAYA

Fear of rubber goods dumping by Japan has led to the formation of the Rubber Manufacturers' Association in Kuala Lumpur. An important product of the Malayan rubber industry is footwear, of which monthly output is said to average 1,000,000 pairs, including sports shoes, sandals, and slippers. Not only Far Eastern markets are being sought for these goods, but apparently also European; at any rate a drive to increase exports of rubber shoes to Britain is said to have been started.

The experience of watching the unloading of 3,000 tons of Malayan rubber at New York, when he visited the city while on leave, convinced H. E. MacKenzie, Johore rubber planter, of the need of control through legislation to prevent mixed and dishonest packing, we are informed.

News has been received of the death in Kuala Lumpur, after a short illness, of R. J. Chittenden. Dr. Chittenden was resident scientist on Prang Besar Estate, Selangor, and was well known for his work on high-grade rubber and clones.

Editor's Book Table

BOOK REVIEWS

"Organic Chemistry." Paul Karrer. Fourth English Edition. Elsevier Publishing Co., Inc., 215 Fourth Ave., New York 3, N. Y. Cloth, 6½ by 10 inches, 994 pages. Price, $8.50.

This edition of the well-known text, corresponding to the eleventh German edition, follows the format of the preceding issue, but contains much new and revised information. As before, the subject matter is divided into four parts: aliphatic compounds, carbocyclic compounds, heterocyclic compounds, and organic compounds with heavy hydrogen and heavy oxygen, but results of recent work are included to bring them up to date.

New sections are included on the following subjects: organic silicon compounds; diacyl peroxides and peracids; streptomycin; and organic compounds containing isottopic carbon and nitrogen. Sections showing considerable revision include the chapters on microanalysis, mineral oil products, organic lithium compounds, oestrogens, vitamins, alkaloids, and others. Extensive tables and a comprehensive subject index round out a volume that will be of considerable value to graduate students and research workers.

"Conveyers and Related Equipment." Second Edition. Wilbur G. Hudson. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Cloth, 6 by 9 inches, 474 pages. Price, $7.

In this edition of the book that has become the standard text on the subject, the author provides a modern and comprehensive coverage that will be a valuable guide to the engineer or contractor planning a system of up-to-date materials handling. New developments since the first edition (1944) are described in detail, and new sections cover pneumatic conveying, dust explosion hazards, technical improvements, making belt conveyers suitable for greater lengths and capacities, and applications of motorized industrial trucks.

The scope of the subject matter can be shown by the 22 chapter headings: general principles; screw conveyers; flight and apron conveyers; bucket elevators; skip hoists; bucket carriers; unit loads; continuous flow conveyer; pneumatic and hydraulic conveyers; belt conveyers; aerial tramways; storage and transport; bins and bunkers; unloading water borne cargoes; crushers, hammermills, and pulverizers; screens and feeders; car unloading; weighing; chains, drives, drive groups, motors; power-plant coal and ash handling; some problems and solutions; and dust explosion hazards. Each type of equipment is described from both the design and functional aspects, with many illustrations used for clarity. A subject index and appendices on nomenclature and hopper valley angles are also included.

NEW PUBLICATIONS

"Dow Corning Silicone Mold Release Agents." Dow Corning Corp., Midland, Mich. 8 pages. This illustrated bulletin presents information on the properties, advantages, and major applications of the company's mold release emulsions and silicone release agents for use with rubber and plastics. Brief descriptions are also included on silicone fluids, compounds, lubricants, resins, and rubbers.

"Properties of Geon Latices." B. F. Goodrich Chemical Co., Rose Bldg., Cleveland 15, O. 4 pages. This bulletin lists the properties of the six Geon latices being marketed by the company. Properties tabulated include those of the latex, a four-mil cast film, and one-mil latex coated paper. Information on applications of each type of latex is also included.

"Here's Why Urac Resin 180 Is Your Best Buy." American Cyanamid Co., 30 Rockefeller Plaza, New York 20, N. Y. 8 pages. Methods for saving time and money by use of Urac 180 resin adhesive are shown in this pamphlet. Versatility, stability, and bonding qualities of the adhesive are described together with typical applications, including plywood pressing, veneer bonding, high-frequency wood bonding, and lumber-core gluing.

Submarine Telegraph Cable Centenary, 1850-1950." Submarine Cables, Ltd., 22 Old Broad St., London E.C.2, England. 20 pages. A history of the development of the submarine cable appears in this illustrated booklet. Beginning with the first cable, insulated with gutta percha and laid across the English Channel, the story describes early progress in cable armoring, the first Atlantic cable, developments in cable design and insulation, and prospects for the future.

Publications of E. I. du Pont de Nemours & Co., Inc., Wilmington 98, Del.

"Akroflex F, An Anti-Flex-Cracking Antioxidant." Report No. 50-4. June, 1950. M. F. Torrence and D. B. Forman. 6 pages. Properties and compounding characteristics of Akroflex F are given in this bulletin, together with test data comparing results obtained in "half and half" tread stocks with those of stocks containing Thermoflex A. Akroflex F is shown to impart greater resistance to flex cracking than Akroflex C, and to approach the general efficiency of Thermoflex A.

"NA-22, An Accelerator for Neoprene." Report No. 50-1, May, 1950. R. R. Radcliff, L. R. Mayo, and F. H. Fritz. 14 pages. Information and test data show neoprene compounds containing NA-22, 2-mercapto imidazoline, cure rapidly at normal vulcanization temperatures to high states of cure. NA-22 does not contribute to darkening on cure, discoloration on light exposure, or staining of common organic finishes.

"St. Joe Zinc Oxides—Technical Data for the Consumer." St. Joseph Lead Co., 250 Park Ave., New York 17, N. Y. 56 pages. This illustrated booklet consists of two parts, the first of which includes a short history of the company and discussion of the production methods used for St. Joe zinc oxides. The second section gives the general properties of zinc oxide and describes its use in rubber compounds, protective coatings, ceramics, chemicals, pharmaceuticals, and other products. Tabulations of the company's applicable zinc oxides, including properties and photomicrographs, are given for each type of use. Copies are available to technologists and purchasing agents in the consuming industries when requests are made on company letterheads.

"Tamol N (Formerly Triton R-100)." Rohm & Haas Co., Washington Sq., Philadelphia 5, Pa. 4 pages. Information on the properties of Tamol N and its use as a dispersing agent in latex compounding appears in this bulletin. Data include solubility in organic solvents, use in pigment pastes, and instructions on procedures to be followed in using Tamol N in latex compounding.

"SPI Plastics Film, Sheeting, and Coated Fabrics Division Progress Report." The Society of the Plastics Industry, Inc., 295 Madison Ave., New York 17, N. Y. 24 pages. This report reviews progress during the past few years of the Division's 11 technical committees in developing test methods for evaluating the quality of plastics film and sheeting. Reports cover the following committees: Group I—low temperature flexibility, cold crack, pliability, fatigue, crease resistance; Group II—abrasion and tear resistance, tensile strength, hardness, burst; Group III—accelerated aging, light fastness, resistance to weathering; Group IV—plasticizer migration, volatilization, and extraction, color transfer, cleaning methods, stain resistance; Group V—toxicity, odor, taste, resistance to mildew, perspiration, insects, and rodents; Group VI—blocking, adhesion, surface slip, adhesion of printing inks, seam strength, hydrostatic resistance; Group VII—flammability, moisture vapor transmission; Group VIII—dimensional stability; Group IX—electrical properties; Group X—nomenclature; and Group XI—heat sealing.

"Natural Rubber 1949—Some Activities in the Field of Development." The International Rubber Development Committee, 19 Fenchurch St., London E.C.3, England. 56 pages. Written in French and English, this illustrated booklet describes work done during 1949 on developing new markets and applications for natural rubber by the British Rubber Development Board, London; Institut Français du Caoutchouc, Paris, France; Baden Penjelidikan Karet Indonesia, Bogor, Indonesia; and Rubber Stichting, Delft, Holland.

"Rental Instruments." InstruRental Co., Washington 5, D. C. 20 pages. This bulletin describes the instrument rental service recently made available by the firm. These instruments are the Esterline-Angus recording A.C. ammeter, recording A.C.-D.C. voltmeter, recording wattmeter, and current transformer.

"Natural Rubber and You." Natural Rubber Bureau, 1631 K St., N.W., Washington 6, D. C. 32 pages. In addition to an outline of the history of the natural rubber industry, this booklet presents charts and tables showing world rubber production figures, natural rubber prices, and world consumption figures. Illustrated sections describe how natural rubber is grown and prepared for shipment in the Far East, and the work of the Rubber Research Institute of Malaya.

"Functional Photography in Business and Industry." Eastman Kodak Co., Rochester 4, N. Y. 16 pages. This illustrated booklet, written in non-technical language, describes the use of photography in research, production, quality control, personnel training, advertising, and sales.

"Hardesty Fatty Acids." W. C. Hardesty Co., Inc., 41 E. 42nd St., New York 17, N. Y. 16 pages. This catalog offers complete specifications and shipping data on the company's line of fatty acids, distributed to the rubber industry by Binney & Smith Co. Materials covered include stearic acid; red oil; animal, vegetable, and fish oil fatty acids; stearine pitch; and glycerine. Also included is a table showing composition of fats and oils; color standards comparator; and temperature conversion tables.

"L&N Bibliography of Polarographic Literature." Leeds & Northrup Co., Philadelphia 44, Pa. Bibliography E-90(1). 104 pages. This bibliography on polarographic analysis covers the period from 1903 up to the middle of 1949 and includes all available foreign and domestic sources. The listing comprises 2,208 references, covers the work by 1,310 authors, and is divided into 903 main subject classifications. References are listed according to date of issue, author, and subject.

"Management of Industrial Research—A Selected and Annotated Bibliography." Arthur D. Little, Inc., Cambridge 42, Mass. 20 pages. Prepared from the viewpoint of the research director, this bibliography of 96 literature references on management of research is divided into the following classifications: general and background; organization; control; research program; research laboratory; and miscellaneous. Abstracts of each reference are given, and a subject index is included.

"Principles and Practice of Flow Meter Engineering." L. K. Spink. Foxboro Co., Foxboro, Mass. 416 pages Price, $7. This seventh edition of the handbook, widely accepted as a standard text and guide on all phases of flow engineering, contains much new and valuable material to bring the book up-to-date. A new section, contributed by R. L. Parshall, gives design details, operating instructions, and tables for measuring flow through open channels by means of weirs and flumes. All aspects of flow engineering are covered in detail, with much tabular data given, and the book contains an eight-page subject index.

"Hercules Cellulose Acetate Molding Powder." Hercules Powder Co., Wilmington, Del. 20 pages. This bulletin gives information on the company's four cellulose acetate molding powder formulations available in several flow types. Information on colors, packaging, and handling also appears, together with tables and charts on physical property test data and photographs of typical applications.

"Antioxidant 2246." Calco Technical Bulletin No. 815. Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. 24 pages. Antioxidant 2246, a phenol-type chemical that is a non-toxic, non-staining, and non-discoloring antioxidant for natural and synthetic rubbers, is described in this booklet. Extensive data obtained in aging and exposure tests of various types of natural rubber and latex stocks are presented to show the protective qualities of the new antioxidant.

"Handbook of Material Handling with Industrial Trucks." Electrical Industrial Truck Association, 3701 N. Broad St., Philadelphia 40, Pa. 72 pages. Price, single copy $1. This handbook is a practical guide for the analysis of material handling operations and the application of the unit-load method with power operated industrial trucks and accessories. The text is divided into four sections: evaluation of industrial truck handling; material handling management; organization of an industrial truck system; and practical truck engineering.

Publications of the British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts., England. No. 121. **"Large Elastic Deformations of Isotropic Materials. Part VI. Further Results in the Theory of Torsion, Shear, and Flexure."** R. S. Rivlin. 24 pages. The forces necessary to produce certain simple types of deformation in a tube of incompressible, highly elastic material, isotropic in its undeformed state, are discussed in detail. The simultaneous simple flexure and uniform extensions normal to the plane of flexure of a thick sheet are also considered, and a number of the results obtained in a previous paper are generalizd.

No. 122. **"The Normal-Stress Coefficient in Solutions of Macro-Molecules."** R. S. Rivlin. 10 pages. A method similar to that adopted by Kramers to calculate the intrinsic viscosity of a high polymer solution is used to calculate its normal-stress coefficient. It is shown that appreciable values of the normal-stress coefficient may be expected in concentrated solutions, and that its non-vanishing results from the orientation of the molecules in the flowing solution.

No. 124. **"The Electron Pairing Theory of the Structure of Conjugated Hydrocarbons."** W. Moffitt. 14 pages. The electron pairing theory of molecular structure is extended in its application to conjugated hydrocarbons. Formulae are derived for calculating internuclear distances, force constants, and interaction constants which appear to give better results than those obtained with the molecular orbital theory. The interaction of two conjugated systems is discussed, and it is shown how the conjugating power of a hydrocarbon residue may be correlated with its residual affinity.

Publications of the Glycerine Producers' Association, 295 Madison Ave., New York 17, N. Y. **"Why Glycerine?"** General information on the properties and uses of glycerine appears, including use in the rubber industry. Tables cover the specific gravity, viscosity, freezing point, vapor pressure, and relative humidity of aqueous glycerine solutions, and a bibliography of literature references is appended. **"Why Glycerine for Textiles?"** In addition to general information on properties, this bulletin gives specific information on the use of glycerine in textile dyeing, printing, and finishing operations.

"1950-51 Year Book. Airplane Section." The Tire & Rim Association, Inc., 2001 First National Tower, Akron 8, O. 8 pages. Price 75¢. **"Calgon Prevents Lime Scale."** Calgon, Inc., Pittsburgh 30, Pa. 8 pages. **"Bi-Monthly Supplement to All Lists of Inspected Appliances, Equipment, Materials."** April, 1950. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11, Ill. 96 pages.

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Market Reviews

CRUDE RUBBER

WEEK-END CLOSING PRICES

Futures	May 27	June 24	July 1	July 8	July 15	July 22
Sept.	28.65	25.05	27.50	30.95	31.90	35.75
Nov.	27.38	24.17	26.67	29.37	29.97	33.82
Jan.	26.35	23.34	25.84	28.05	28.10	31.79
Mar.	25.55	22.50	25.00	27.00	27.00	30.35
May	24.90	21.85	24.00	26.20	25.50	28.85
July	24.10	21.05	23.20	25.40	24.70	28.05
Total weekly sales, tons	9,310	8,930	11,620	4,470	9,220	11,270

VERY active trade and commission house buying and short covering sent rubber futures prices skyrocketing on the Commodity Exchange during July. The basic factor behind the added demand for rubber was the Korean conflict and the threat of a major war. Extra consumer buying of tires and other rubber products, promoted by fears of shortages in the near future, has placed pressure on manufacturers, who in turn are seeking to replenish their stocks and build up inventories. This competitive buying by manufacturers served to push up prices of crude rubber to the point where fear was voiced that the government may be forced to impose price controls and take over all buying.

On the other hand, trade sources believe that barring a major war the high price of rubber will induce greater production in the Far East, while also serving to increase synthetic rubber production. A satisfactory solution of the Korean crisis will leave the public with much hoarded rubber products and thus reduce demand. Such lessened demand coupled with increased supplies of natural and synthetic rubber will glut the market and send prices tumbling.

This fear of a market break had few traders willing to maintain long positions in the market, and this caution resulted in widening differentials between nearby and distant months. In view of the market fluctuations, the Exchange's board of governors raised margin requirements on contracts on July 24 and again on July 28. The minimum required margin for trading in rubber futures was raised from $900 to $1,500 and then to $2,500 per contract; for hedging purposes, from $750 to $1,000, then $1,500 per contract; and for straddle trades, from $250 to $400 and then to $750 per contract.

September futures started the month at the low of 27.50¢, rose to end the month at a high of 46.30¢. December futures advanced from 26.15¢ on July 3 to a high of 38.90¢ on July 31. The activity of the market is shown in the total monthly trading volume of 36,040 tons, which can be compared to the record postwar high of 47,350 tons sold during June.

New York Outside Market

COMPETITIVE purchasing by rubber manufacturers because of the squeeze in nearby rubber resulted in the spot price for No. 1 sheets rising to reach the 50¢ level for the first time since 1926. The spot price started the month at 31.75¢, then rose irregularly to a high of 50.00¢ on July 28 and 31. Prices for the off-grades showed similar advances, although somewhat more irregularly. No. 3 sheets went from 30.25¢ on July 3 to a high of 49.00¢ on July 28 and 31. No. 2 Brown started at 25.75¢ on July 3 and rose to a peak of 42.00¢ on July 28. Prices for Flat Bark began the month at 23.25¢ and rose steadily to a high of 39.50¢ on July 28 and 31.

WEEK-END CLOSING PRICES

	May 27	June 24	July 1	July 8	July 15	July 22
No. 1 R.S.S.:						
Spot	30.50	27.50	31.25	36.00	36.25	41.25
Aug.	30.00	26.25	29 00	32.00	33.25	38.25
Sept.	29.00	25.25	28.00	31.00	32.00	36.50
Oct.-Dec.	28.50	24.50	27.25	29.50	30.00	35.50
No. 3 R.S.S.	29.50	27.25	30.25	35.00	35.00	39.75
No. 2 Brown	27.00	24.25	25.75	29.50	30.00	33.00
Flat Bark	24.50	22.50	26.25	27.00	28.50	31.75

Latices

MORE ample supplies of *Hevea* latex in September and October should see some easing of the present acute shortage, according to Arthur Nolan, writing in the July issue of *Natural Rubber News*. It appears, however, that supplies to meet full production capacity will not be reached until some time next year. The future outlook is quite difficult to forecast because the extent of domestic demand will depend greatly on the price of latex.

Imports of *Hevea* latex during May totaled 3,183 long tons, dry weight; consumption, 4,300 long tons; and month-end stocks, 4,353 long tons. Bulk prices of the latex have averaged about 7.5¢ or slightly higher per pound than the price of No. 1 smoked sheets. With the rising crude rubber prices, *Hevea* latex prices during July ranged from 40-60¢ a pound, dry weight. There has also been some influx of brand-name latex from Europe, with prices quoted at 45-53¢ a pound solids. There also appears to be some black marketing of latex in small lots to distressed buyers, with prices ranging from 65¢ a pound and up.

June production of GR-S latex dropped to 2,492 long tons, dry weight, and July production was estimated at 2,850 long tons. While supplies are not too tight, planning of GR-S latex purchases is necessary, and some purchasers have experienced difficulty in meeting immediate needs. GR-S latex bulk prices remain unchanged at 18.5-20.25¢ a pound, dry weight.

RECLAIMED RUBBER

THE boom in the reclaimed rubber industry first noted during the end of May continued unabated during July, with reclaimers reporting all production sold out. Expectations are that the high level of demand will continue for at least a few months. The new higher prices for reclaims are shown in the table below. Whole tire and peel reclaims rose 0.5-0.75¢ a pound; while black tube reclaims rose 1-1.25¢ a pound; red tube, 1.5¢ a pound; GR-S tube, 0.5¢ a pound; and Butyl tube, 0.5¢ a pound.

Final April and preliminary May statistics on the domestic reclaimed rubber industry are now available. April production totaled 22,683 long tons; imports, 33 long tons; consumption, 21,318 long tons; exports, 982 long tons; and month-end stocks, 28,352 long tons. Preliminary figures for May give a production of 24,795 long tons; consumption, 24,305 long tons; exports, 881 long tons; and month-end stocks, 27,555 long tons.

Reclaimed Rubber Prices

	Sp. Gr.	¢ per Lb.
Whole tire	1.18-1.20	8.75/ 9.50
Peel	1.18-1.20	8.75/10.00
Inner tube		
Black	1.20-1.22	12.75/13.50
Red	1.20-1.22	15.5 /16.00
GR-S	1.18-1.20	10 /10.50
Butyl	1.16-1.18	9 / 9.50

The above list includes those items or classes only that determine the price basis of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

SCRAP RUBBER

THE current squeeze in crude rubber and the boom in the reclaimed rubber industry resulted in a marked improvement in scrap rubber business during July. For the first time in months, reclaimers were said to be taking substantial tonnages of scrap rubber, and at prices showing marked change from previous quotations. Current levels, it was expected, would probably be held until the end of July, but higher scrap rubber prices during August are said to be inevitable.

Mixed auto tires rose $4.00 per net ton both at Akron and in the East, but peelings showed little change. Black and red passenger tubes rose 1.0¢ a pound, respectively, at all consuming points.

Following are dealers' selling prices for scrap rubber, in carload lots, delivered to mills at the points indicated:

	Eastern Points	Akron, O.
	(Per Net Ton)	
Mixed auto tires	$19.00	$21.00
Peelings, No. 1	50.00	50.00
3	30.00	30.00
	(¢ per Lb.)	
Black inner tubes	6.00	6.00
Red passenger tubes	9.00	9.00

COTTON AND FABRIC

NEW YORK COTTON EXCHANGE
WEEK-END CLOSING PRICES

Futures	May 27	June 24	July 1	July 8	July 15	July 22
Oct.	31.88	32.76	33.08	33.35	36.39	37.37
Dec.	31.80	32.62	33.01	33.34	36.33	37.33
Mar.	31.80	32.68	32.88	33.33	36.27	37.27
May	31.76	32.63	32.98	33.33	36.24	37.15
July	31.31	32.40	32.60	32.92	35.79	36.58
Oct.	29.80	30.85	31.04	31.45	33.06	33.70

COTTON futures prices on the New York Cotton Exchange continued their advance during July, with sharp

rises noted particularly on nearby deliveries. Three major factors contributing to the price rise were: (1) the Korean crisis, which is expected to result in greater military demands for cotton goods; (2) the general inflationary trend; and (3) the low estimated cotton acreage for this year. The first official acreage estimate gave 19,032,000 acres as of July 1, as compared with 27,719,000 acres a year ago. Assuming average yields, it was calculated that the crop on the estimated acreage would be around 10,000,000 bales and would necessitate heavy inroads into the carry-over if present consumption levels continue.

In an effort to stabilize cotton prices the Commodity Credit Corp. on July 18 announced that it will shortly accept offers for 1948-crop pooled cotton on an every-other-working-day basis, instead of at irregular periods. In addition, the CCC announced that it will give farmers two extra months to dispose of 1949-crop cotton, with loans carried to September 30. Advances in prices for 1951 futures lagged behind those of nearby months on the basis of reports that there will probably be no production controls on cotton next year. The Exchange reported that 5,609,583 bales of cotton had been exported as of July 22, compared with 4,693,232 bales in the same period last year.

The spot price for 15/16-inch cotton started the month at 34.90¢, advanced to a high of 40.00¢ on July 17, and then fluctuated irregularly to end the month at 39.53¢. October futures went from 33.24¢ on July 3 to a high of 38.83¢ on July 28, then closed the month at 38.41¢.

Fabrics

Rising prices prevailed in the industrial fabrics market last month in the face of heavy business and continuing high demand. Business was brisk in the cotton tire cord and chafer field at higher prices, with contracts made into the late fall. Most duck mills were completely withdrawn from the market during the latter part of July in the face of erratic cotton prices. New quotations for ducks are being awaited.

In sateens, twills, wide drills, and other industrial fabrics, most mills continued to place business, but in pricing each fabric pegged each sale to the cost of raw cotton futures for covering the contract. This system of pricing is now being used extensively and is said to be working out well from the mill standpoint. Business is being done in strong volume through the end of the year.

The osnaburg market was only moderately active as some mills withdrew, following the lead of duck houses. Most buyers appeared to be holding out while awaiting the development of stronger market trends. Activity in sheetings was spotty in view of the uncertain market, but print cloths sold strongly through December.

Cotton Fabrics

Drills		
59-inch 1.85-yd.	*yd.*	$0.41
2.25-yd.		.355
Ducks		
38-inch 1.84-yd. S. F.	*yd.*	nom.
2.00-yd. D. F.	*yd.*	nom.
51.5-inch, 1.35-yd. S. F.		nom.
Hose and belting		.68
Osnaburgs		
40-inch 2.11-yd.	*yd.*	.265
3.65-yd.	*yd.*	.1675
Raincoat Fabrics		
Bombazine, 64x60 5.35-yd.	*yd.*	nom.
Print cloth, 38½ inch, 64x60		.185
Sheeting, 48-inch, 4.17-yd.		.22¾
52-inch 3.85-yd.		.245

Chafer Fabrics		
14-oz/sq. yd. Pl.	*lb.*	$0.75
11.65-oz/sq. yd. S.		.685
10-80-oz./sq. yd. S.		.725
8.9-oz./sq. yd. S.		.735
Other Fabrics		
Headlining, 59-inch 1.35-yd 2-ply,	*yd.*	.62
64-inch 1.25-yd. 2-ply		.65
Sateens, 53-inch 1.32-yd.		.625
58-inch 1.21-yd		.6875
Tire Cords		
K. P. std., 12-3-3	*lb.*	.785
12-4-2		.775

RAYON

FIRST-QUARTER 1950 production of tire cord and fabric, including cotton chafer fabric, totaled 109,547,000 pounds, as compared with 102,573,000 pounds produced during the last quarter of 1949. Excluding cotton chafer fabrics, which are used in both cotton and rayon cord tires, 96,000,000 pounds of tire cord and fabrics were produced during the first quarter of this year, an increase of 5,000,000 pounds over the preceding quarter. Of this total, 76%, or 73,000,000 pounds, were of rayon and nylon; the remainder was cotton. Production of rayon and nylon tire cord and fabric showed no change from the fourth quarter of 1949, but production of cotton tire cord and fabric increased 5,000,000 pounds over that of the preceding quarter. This increase can be attributed to insufficient supplies of rayon cord and fabric, resulting in a greater demand for cotton.

Shipments of rayon to domestic consumers during June amounted to 103,100,000 pounds, an increase of 1% over the May figure. Of this total, 78,400,000 pounds were filament yarn, with viscose high-tenacity yarn comprising 27,000,000 pounds or 6% higher than in the preceding month. June shipments of high-tenacity yarn were still influenced by the strike at one producing plant.

Two changes in rayon tire yarn and fabric prices occurred during July, and current prices follow:

Rayon Prices

Tire Yarns		
1100/ 480	$0.55	$0.58
1100/ 490	.55	
1150/ 490	.55	
1650/ 720	.54	.57
1650/ 980	.54	
1900/ 980	.54	
2200/ 960	.53	
2200/ 980	.53	
4400/2934	.55 /	$0.56
Tire Fabrics		
1100/490/2	.67	
1650/980/2	.645 /	.66
2200/980/2	.63	

Compounding Ingredients— Price Changes and Additions

Accelerator-Activators, Inorganic			
Litharge, Eagle	*lb.*	$0.1475 /	$0.1485
National Lead	*lb.*	.1475 /	.1485
Red lead, Eagle and National Lead	*lb.*	.1575	
White lead, Eagle and National Lead	*lb.*	.1475 /	.1575
White lead silicate, Eagle,	*lb.*	.155 /	.1725
National Lead	*lb.*	.1375 /	.1475
Accelerator-Activators, Organic			
Emersol 110	*lb.*	.155 /	.1675
120	*lb.*	.165 /	.1775
130	*lb.*	.1875 /	.20
210 Elaine	*lb.*	.16 /	.1875
Emery 600	*lb.*	.13 /	.1575
Hyfac 430	*lb.*	.155 /	.1675
431	*lb.*	.165 /	.1775
Antioxidants			
AgeRite Gel	*lb.*	$0.60 /	$0.62
H.P.	*lb.*	.67 /	.69
Hipar	*lb.*	.91 /	.93
Powder	*lb.*	.49 /	.51
Resin	*lb.*	.65 /	.67
D	*lb.*	.49 /	.51
Stalite	*lb.*	.49 /	.51
White	*lb.*	1.40 /	1.50
D	*lb.*	1.45 /	1.55
Antioxidant 2246	*lb.*	1.60 /	1.70
Flectol H	*lb.*	.49 /	.56
Ionol	*lb.*	.95 /	1.40
Rio Resin	*lb.*	.52 /	.54
Santoflex 35	*lb.*	.67 /	.74
AW	*lb.*	.66 /	.73
B	*lb.*	.49 /	.56
BX	*lb.*	.60 /	.67
Santowhite Crystals	*lb.*	1.55 /	1.62
L	*lb.*	.49 /	.56
MK	*lb.*	1.25 /	1.32
Carbon Blacks			
(HAF) Philblack O	*lb.*	.075 /	.119
(MAF) Philblack A	*lb.*	.0575 /	.10
(MT) Thermax	*lb.*	.0325	
Stainless	*lb.*	.04	
Colors, White—Zinc Oxide			
Azo ZZZ-11,-44,-55	*lb.*	.1475 /	.1575
-66	*lb.*	.17 /	.18
35% leaded	*lb.*	.1425 /	.1525
Eagle AAA, lead free	*lb.*	.1475 /	.1575
5% leaded	*lb.*	.1475 /	.1575
35% leaded	*lb.*	.1425 /	.1525
50% leaded	*lb.*	.14 /	.15
Florence Green Seal	*lb.*	.165 /	.175
Red Seal	*lb.*	.16 /	.17
White Seal	*lb.*	.17 /	.18
Horsehead XX-4,-78	*lb.*	.1475 /	.1575
Kadox-15,-17,-22	*lb.*	.1475 /	.1575
-25	*lb.*	.17 /	.18
Lehigh, 35% leaded	*lb.*	.1425 /	.1525
50% leaded	*lb.*	.14 /	.15
Protox-166	*lb.*	.1475 /	.1575
Standard, 5% leaded	*lb.*	.1475 /	.1575
Latex Compounding Ingredients			
Resin Emulsion #226	*gal.*	1.05	
#2246	*gal.*	1.30	
#2402, #2343	*gal.*	1.60	
Tamol N	*lb.*	.1525 /	.26
Plasticizers and Softeners			
Pigmentar	*lb.*	.03⅞ /	.0511
Pigmentaroil	*lb.*	.03⅞ /	.0511
Reinforcers, Other Than Carbon Black			
Good-Rite Resin 50	*lb.*	.36 /	.38

Carbon Black Statistics — First Quarter, 1950

Following are statistics for the production, shipments, producers' stocks, and exports of carbon black for the first quarter, 1950. Furnace blacks are classified as follows: SRF, semi-reinforcing furnace black; HMF, high modulus furnace black; FEF, fast extruding furnace black; and HAF, high abrasion furnace black. Statistics on thermal black are included with SRF black to avoid disclosure of individual company operations.

	(Thousands of Pounds)		
Production:	Jan.	Feb.	Mar.
Furnace types:			
SRF	16,998	16,755	22,503
HMF	7,178	7,522	5,691
FEF	11,476	10,175	11,450
HAF	14,845	13,612	15,317
Total	50,497	48,064	54,961
Contact types	48,192	45,007	50,465
TOTALS	98,689	93,071	105,426
Shipments:			
Furnace types:			
SRF	24,343	23,763	25,722
HMF	8,085	8,389	7,502
FEF	10,930	12,378	12,415
HAF	14,092	13,262	17,933
Total	57,450	57,792	63,572
Contact types	56,196	53,330	54,646
TOTALS	113,646	111,122	118,218
Producers' Stocks, End of Period:			
Furnace types:			
SRF	30,598	23,590	20,371
HMF	23,670	22,803	20,992
FEF	12,788	10,585	9,620
HAF	20,857	21,207	18,591
Total	87,913	78,185	69,574
Contact types	109,568	101,245	97,064
TOTALS	197,481	179,430	166,638
Exports:			
Furnace types	9,487	10,967	11,842
Contact types	20,947	26,045	19,775
TOTALS	30,434	37,012	31,617

SOURCE: Bureau of Mines, United States Department of the Interior, Washington, D. C.

United States Imports, Exports, and Reexports of Crude and Manufactured Rubber

	April, 1950 Quantity	April, 1950 Value
Exports of Domestic Merchandise		
UNMANUFACTURED, Lbs.		
Chicle and chewing gum bases	196,589	$69,177
Balata	872	2,285
Synthetic rubbers: GR-S	287,226	80,765
Neoprene	923,651	334,899
Nitrile	382,463	161,979
"Thiokol"	1,200	1,104
Polyisobutylene	142,220	42,935
Other, except Butyl	4,220	6,597
Reclaimed rubber	2,199,949	170,187
Scrap rubber	1,723,544	41,581
TOTALS	5,861,934	$911,509
MANUFACTURED		
Rubber cement ... gals.	62,448	$123,943
Rubberized fabric: auto cloth ... sq. yds.	10,483	12,124
Piece goods and hospital sheeting ... sq. yds.	91,834	49,216
Rubber footwear:		
Boots ... prs.	3,430	13,168
Shoes ... prs.	8,528	10,970
Rubber-soled canvas shoes ... prs.	22,949	44,103
Soles ... doz. prs.	18,904	49,752
Heels ... doz. prs.	49,565	41,731
Soling and toplift sheets ... lbs.	409,570	77,366
Gloves and mittens ... doz. prs.	12,267	39,559
Water bottles and fountain syringes ... no.	23,523	17,125
Other drug sundries	.....	179,797
Rubber and rubberized clothing	.....	218,581
Toy and novelty balloons	.....	25,180
Rubber toys and balls	.....	24,167
Erasers ... lbs.	21,389	14,367
Hard rubber goods: battery boxes ... no.	13,660	23,787
Other electrical goods ... lbs.	180,741	161,727
Combs, finished ... doz.	4,571	5,540
Other	.....	11,477
Tires and casings: truck and bus ... no.	56,769	2,108,283
Auto ... no.	32,250	372,160
Aircraft	.....	88,196
Farm tractor, etc ... no.	9,727	314,292
Other off-the-road	2,927	227,610
Bicycle ... no.	7,012	7,264
Motorcycle ... no.	909	5,236
Other ... no.	1,513	29,907
Inner tubes: auto, truck, bus ... no.	57,458	196,102
Other ... no.	12,943	56,264
Solid tires: truck and industrial ... no.	2,844	34,052
Tire repair materials: camelback ... lbs.	248,922	68,638
Other ... lbs.	180,454	142,320
Rubber and friction tape ... lbs.	52,701	36,667
Belting: auto and home ... lbs.	68,625	82,574
Transmission: V-belts lbs.	96,568	161,541
Flat belts ... lbs.	42,036	50,377
Other ... lbs.	27,761	27,651
Conveyer and levitator ... lbs.	135,242	79,980
Other ... lbs.	20,232	15,562
Hose and tubing ... lbs.	385,973	241,850
Rubber packing ... lbs.	110,774	106,102
Mats, flooring, tiling lbs.	351,719	89,386
Thread: bare ... lbs.	14,918	21,477
Textile covered ... lbs.	24,255	64,116
Gutta percha manufactures ... lbs.	5,000	3,000
Latex and other compounded rubber for further manufacture ... lbs.	414,234	138,554
Other natural and synthetic rubber manufactures	......	354,219
TOTALS	......	$6,267,06
GRAND TOTALS, EXPORTS	......	$7,178,569
Reexports of Foreign Merchandise		
UNMANUFACTURED, Lbs.		
Crude rubber	1,431,392	$340,781
Butyl synthetic rubber	11,232	2,093
Scrap rubber	51,210	1,793
TOTALS	1,493,834	$344,667
MANUFACTURED		
Drug sundries, except hot water bottles and fountain syringes	......	$437
Toy and novelty balloons	......	403
Rubber toys and balls	......	1,433
Erasers ... lbs.	2,040	551
Hose and tubing ... lbs.	1,407	1,336
Other natural and synthetic rubber manufactures	......	1,041
TOTALS	......	$5,201
GRAND TOTALS, REEXPORTS	......	$349,868

	April, 1950 Quantity	April, 1950 Value
Imports for Consumption of Crude and Manufactured Rubber		
UNMANUFACTURED, Lbs.		
Crude rubber	162,216,669	$27,412,444
Rubber latex	9,845,662	2,199,149
Chicle, crude	18,056	16,202
Guayule	392,000	47,117
Balata	152,878	45,844
Jelutong or Pontianak	550,516	211,744
Gutta percha	66,772	23,369
Synthetic rubber	5,155,662	782,902
Reclaimed rubber	74,489	5,080
Scrap rubber	2,988,464	85,450
TOTALS	181,461,168	$30,829,301
MANUFACTURED		
Tires: auto, bus, truck no.	856	$9,115
Bicycle ... no.	210	394
Other ... no.	350	162
Inner tubes: auto, bus, truck ... no.	144	220
Rubber footwear:		
Boots ... prs.	3,702	7,300
Shoes and overshoes prs.	2,914	2,347
Rubber-soled canvas shoes ... prs.	7,900	3,872
Athletic balls: golf ... no.	31,200	6,968
Tennis ... no.	117,774	19,700
Other ... no.	354,932	18,626
Rubber toys, except balloons	.....	40,690
Hard rubber products	.....	10,628
Rubberized printing blankets ... lbs.	567	1,262
Rubber and cotton packing ... lbs.	225	274
Gaskets and valve packing	.....	4
Molded rubber insulators	.....	200
Rubber belting ... lbs.	1,798	2,301
Hose and tubing	.....	1,436
Drug sundries	.....	2,342
Rubber instruments ... doz.	270	2,970
Bands ... lbs.	247	159
Synthetic rubber products	.....	545
Other soft rubber goods	.....	69,162
TOTALS	.....	$200,677
GRAND TOTALS, IMPORTS	.....	$31,029,978

SOURCE: Bureau of Census, United States Department of Commerce, Washington, D. C.

United States Rubber Statistics — April, 1950

(All Figures in Long Tons, Dry Weight)

	New Supply			Distribution		Month-End Stocks
	Production	Imports	Total	Consumption	Exports	
Natural rubber, total	0	72,603	72,603	53,831	639	101,230
Latex, total	0	4,395	4,395	4,083	0	4,894
Rubber and latex, total	0	76,998	76,998	57,914	639	106,124
Synthetic rubbers, total	*29,158 †5,663	2,302	37,123	37,794	992	83,440
GR-S types	*24,638 †5	1,954	26,642	29,246	128	62,518
Butyl	*4,475	348	4,823	4,490	281	12,039
Neoprene	†4,271	0	4,271	3,038	412	5,323
Nitrile types	†1,387	0	1,387	1,020	171	3,560
Natural rubber and latex, and synthetic rubbers, total	34,821	79,300	114,121	95,708	1,631	189,564
Reclaimed rubber, total	22,683	33	22,716	21,318	982	28,352
GRAND TOTALS	57,504	79,333	136,837	117,026	2,613	217,916

*Government plant production.
†Private plant production.
SOURCE: Rubber Division, ODC, United States Department of Commerce, Washington, D. C.

Estimated Automotive Pneumatic Casings and Tube Shipments, Production, Inventory, May, April, 1950: First Five Months, 1950-1949

	May, 1950	% of Change from Preceding Month	April, 1950	First Five Months, 1950	First Five Months, 1949
Passenger Casings					
Shipments					
Original equipment	2,732,699		2,648,289	13,503,825	10,410,630
Replacement	4,497,711		3,694,559	15,842,438	14,052,940
Export	46,450		53,325	228,275	200,560
TOTAL	7,276,860	+13.77	6,396,173	29,574,538	24,664,130
Production	7,369,190	+13.92	6,468,984	31,326,803	26,640,866
Inventory end of month	10,364,646	+ 0.10	10,353,930	10,364,646	10,769,289
Truck and Bus Casings					
Shipments					
Original equipment	386,427		326,615	1,760,362	1,729,734
Replacement	798,268		743,618	3,322,530	2,666,215
Export	59,586		59,156	312,252	428,581
TOTAL	1,244,281	+10.17	1,129,389	5,395,144	4,824,530
Production	1,259,897	+13.05	1,114,443	5,718,080	5,424,576
Inventory end of month	2,002,692	+ 0.80	1,986,705	2,002,692	2,531,914
Total Automotive Casings					
Shipments					
Original equipment	3,119,126		2,974,904	15,264,187	12,140,364
Replacement	5,295,979		4,438,177	19,164,968	16,719,155
Export	106,036		112,481	540,527	629,141
TOTAL	8,521,141	+13.23	7,525,562	34,969,682	29,488,660
Production	8,629,087	+13.79	7,583,427	37,044,883	32,065,442
Inventory end of month	12,367,338	+ 0.22	12,340,635	12,367,338	13,301,203
Passenger and Truck and Bus Tubes					
Shipments					
Original equipment	3,115,570		2,974,646	15,255,862	12,121,661
Replacement	3,516,967		3,050,549	13,880,108	12,381,098
Export	55,388		68,774	301,344	430,069
TOTAL	6,687,925	+ 9.75	6,093,969	29,437,314	24,932,828
Production	7,089,327	+12.79	6,285,414	31,030,193	27,758,260
Inventory end of month	12,109,933	+ 3.41	11,710,259	12,109,933	12,410,463

NOTE: Cumulative data on this report include adjustments made in prior months.
SOURCE: The Rubber Manufacturers Association, Inc., New York, N. Y.

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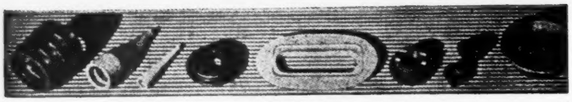

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